

AT A GLANCE

BUSH CONSTRUCTION

LOCATION: Davenport, Iowa

FOUNDED: 2008

EMPLOYEES: 60 including 30 technical professionals and managers and 30 field labor staff

IMPACT: Awarded \$61M in government contracts for 2011–2012

OVERVIEW: A division of the McCarthy-Bush Corporation, Bush Construction provides design-build, general contracting, and construction management services for a wide range of projects in the Quad Cities and throughout the Midwest.



Government Contracts Spur Fast Growth for Bush Construction

The task presented to A. J. Loss in 2008 was straightforward: launch a new vertical building division for Davenport-based McCarthy-Bush Corporation while serving as the new company's first-ever president and its only employee. Loss was excited.

"It was an opportunity to build and grow a construction company the way I had hoped and dreamed it would be done," he recalls.

Loss, recognizing that government contracts would be a key part of the company's success, also was very interested in learning about CIRAS' Procurement Technical Assistance Program (PTAP). He quickly signed up for a seminar describing its services.

Nearly six years later, Bush Construction has grown to 60 employees and can boast about awards of more than \$61M in government contracts during 2011–2012. Those projects, among others, include the \$13M first phase of the Western Illinois University Quad Cities Riverfront Campus, a new \$21M maintenance facility for Rock Island's transit district MetroLINK, and the \$6M renovation of a Rock Island industrial building into the Jackson Square Housing Complex.

"CIRAS' PTAP has a lot to offer businesses," Loss says. "They have counseled us on how to work with small businesses and establish joint ventures, and they have used their data-mining capabilities to provide information we need to successfully compete for contracts."

Government contracting is "not for everyone," Loss adds. "CIRAS serves as a valuable resource in finding critical information and knowing the right people to contact."

One of the first challenges Bush Construction faced involved finding the right contracts to pursue. Many government programs are targeted at small businesses to help them succeed in the marketplace. But Bush, because of its parentage, wasn't viewed as small.

"We are affiliated with the McCarthy-Bush Corporation, which has a long and respected history in construction, mining, and

Continued on page 2

- 1 Government Contracts Spur Fast Growth for Bush Construction
- 3 GOVTALK—B2G Sales
- 4 CIRAS and IPRT Help MAHLE Filter Systems Save Money, Retain Jobs
- 5 Innovative Thinking at Plas-Tech Tooling Leads to Successful Product Launch
- 6 ABI Partners to Promote Career Opportunities in Advanced Manufacturing
- 7 ISU Lab Overview
- 7 Made in Iowa
- 8 Smith-Lever Act
- 8 CIRAS Welcomes New Advisory Council Members
- 9 CIRAS Innovation Services Stimulate Major Investment at Kreg Tool Company
- 10 CIRAS-Sparked Partnerships between Students and Industry Boost Businesses' Economic Impact by \$17 million
- 11 CIRAS Connections
- 11 Staff News
- 12 Five Iowa Women Awarded as Among Manufacturing's Best
- 13 State of the State
- 14 Quoteworthy
- 14 Upcoming Events
- 15 Contact Information
- 16 The Innovation Cycle

On the Cover: Bush Construction recently completed MetroLINK, Rock Island's transit maintenance facility and bus transfer station.

CIRAS Mission: *Every day we will enhance the performance of industry through applied research, education, and technical assistance.*

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steel fabrication," Loss explains. "We have great bonding support . . . and that means we've been able to bid on projects that a start-up company typically cannot. The downside, however, is that we were classified as a large business even in the beginning, when I was the only employee."

CIRAS helped Bush find programs where it could pursue contracts alongside small businesses.

"Companies have to know what programs are available and exactly what the regulations are," says Beth White, the CIRAS government contracting specialist who works with Bush. "We work with these things every day, so we serve as a resource, finding information and answering their questions."

The first long-term contract Bush pursued was through the mentor-protégé joint venture program, part of the U.S. Small Business Administration's 8(a) Business Development Program. The arrangement helps economically and socially disadvantaged firms partner with larger companies and thus gain a foothold in the industry.

Loss researched hundreds of small businesses and eventually selected Chicago Architectural Metals as a partner.

"We are the mentor, and our role is to help the small contractor grow their business," he says. "The partnership benefits both of us. We have the opportunity to be involved with contracts that we otherwise wouldn't have, and we help the protégé become a more successful business by helping educate them through

our knowledge of best-in-class business processes."

As a result of these efforts, Bush Construction was one of three subcontractors to win a \$40M Multiple Award

Task Order Contract in 2009. The one-year contract came with four additional one-year options to complete multiple projects (ranging in size from \$2,000 to \$200,000) at Scott Air Force Base near St. Louis. The company created a satellite office at the base to oversee the continuing work.

"CIRAS' assistance with federal contracting has helped us keep our business operations sharp. And that has rolled over into our ability to deliver great projects for our commercial clients as well."

—A. J. Loss

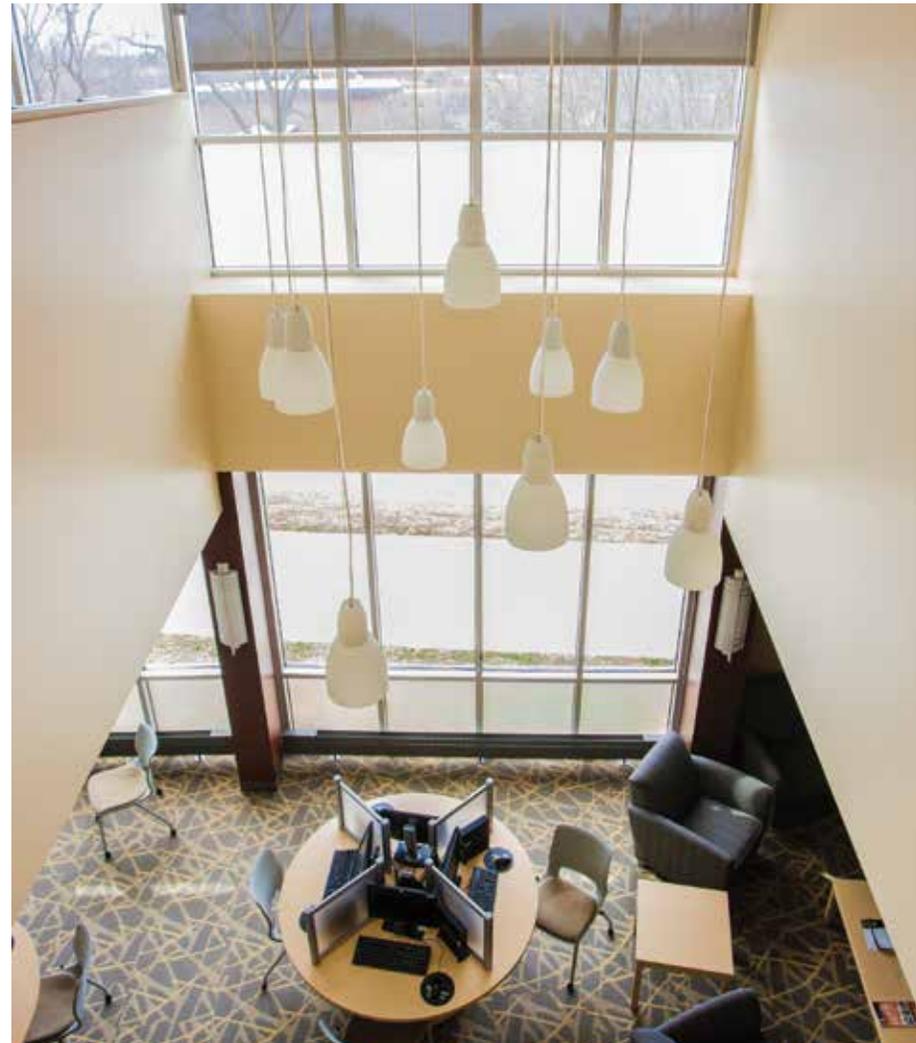
In addition to joint ventures, Bush subcontracts work to small businesses on many of its projects. "Federal regulations and some state regulations require that a certain percentage of project work be done by small businesses or businesses of a specific designation," Loss explains.

CIRAS, through its extensive databases, has helped Bush search for small businesses that qualify for set-aside programs, such as businesses run by minorities or women.

"There are times when small companies aren't part of the government's System for Award Management database, so we have to search in other places," Loss says. "Beth can direct us to places we can look."

CIRAS also has helped Bush Construction gain exposure and develop a reputation as being willing to work with smaller partners. "One of our vice presidents, for example, will serve on a CIRAS panel discussing joint venture projects," Loss says. "This is a chance to network with those small businesses."

Loss says Bush's relationship has evolved from CIRAS serving as an



Bush Construction projects have included (top) the Davenport Public Library East Avenue Branch and (bottom) the Black Hawk College Student Services Center.

educator to being a partner. While CIRAS provides access to data and information on contract acquisition, Bush Construction gives feedback on how things are handled during construction. This ultimately helps CIRAS be a better resource for both Bush and other Iowa businesses.

Looking back, the growth has come just as Loss hoped it would in 2008.

“CIRAS’ assistance with federal contracting has helped us keep our business operations sharp,” Loss explains. “And that has rolled over into our ability to deliver great projects for our commercial clients as well.”

➤ For more information, contact Beth White at 563-370-2166 or whiteb@iastate.edu.

Government Contracting during a Disaster

by Gordon Bonnes

Does your company provide a product or service that the government would need during a disaster? Have you positioned your business to be identified as a source during disasters? As a disaster services or products contractor, it is very important that your company is either a known entity or comes up in search results when government buyers are looking for potential contractors.

CIRAS is available to help you through this process.

The first step is obtaining an active SAM (System for Award Management) Registration. When completing this registration, be sure to enter Disaster Relief Data in the Assertions section of your profile as well as bonding entries and geographic service areas. Also be sure to navigate to the SBA Dynamic Small Business Search and ensure that your profile is complete and up to date.

Another area to pursue is a presence with FEMA. This can be accomplished through the agency’s Industry Liaison Program; you will need to be invited to be added to the FEMA vendor database. Also, you can create an account with the FEMA Debris Removal Registry. Be sure to market your product or service to FEMA state county coordinators in your service area. They make many of the local decisions.

Other areas to consider in disaster contracting include adding your name to the Red Cross’ database of interested vendors and registering with the state of Iowa as an approved vendor.

The CIRAS Procurement Technical Assistance Program (PTAP) is available to assist you with this or any other government contracting issue. Contact Gordon Bonnes at 712-308-2229 or gbonnes@iastate.edu. Or, to participate in more discussion, join our LinkedIn group at <http://linkd.in/1ICgNWF>.



AT A GLANCE

MAHLE Filter Systems

HEADQUARTERS: Stuttgart, Germany; Manufacturing locations in Iowa—Winterset (filtration) and Atlantic (engine components)

EMPLOYEES: 65 employees at Winterset facility; 65,000 worldwide

ANNUAL SALES: \$13.8 billion (USD)

IMPACT: Saved \$100,000 per year; retained at least 10 jobs at Winterset facility

OVERVIEW: MAHLE is one of the largest automotive suppliers in the world, supplying various automotive parts including pistons, rings, fuel filters, and intake manifolds.

Above: The final assembly station where the finished filters are inspected, boxed, and palletized. **Below:** An example of the worst-case scenario of the filter case stamped from the press, prior to working with IPRT.

CIRAS and IPRT Help MAHLE Filter Systems Save Money, Retain Jobs

A Winterset, Iowa, manufacturer of fuel and air filters expects to save at least 10 jobs and \$100,000 a year after CIRAS and an Iowa State University testing lab helped the company improve its production process and end long-standing problems tied to the use of unsuitable steel.

The Winterset arm of MAHLE Filter Systems North America first contacted CIRAS two years ago to address a recurring problem with the stainless steel material used to produce filters for certain automobiles.

MAHLE Winterset, which mostly manufactures fuel and air filters for cars, ultimately was matched via CIRAS with Iowa State University's Institute for Physical Research and Technology (IPRT) to provide a metallurgical analysis service. In 2013, IPRT performed chemical analysis tensile tests and formability tests on the steel. The results saved money for MAHLE Winterset and jump-started the facility's efforts to improve its production line.

"Over time, the quality of material had degraded to the point where we were having problems drawing the filter case," says Brett Shady, operations engineer at MAHLE Winterset.

By the time Shady contacted CIRAS, steel quality was vastly degraded. MAHLE's tooling used to stamp the metal would break almost weekly because of large

slivers of metal falling into the die. It would take several hours to replace.

The company had tried multiple suppliers but always got similar results. MAHLE was uncertain whether the material or some other issue was causing its problems.

IPRT testing eventually confirmed that steel from a new vendor would end the manufacturing issues and that the previous supplier's steel had a poor r-value (a number that indicates how the material behaves when stretched). As a result, MAHLE Winterset started using a new vendor's steel sheets.

"I would estimate that switching steel will save the company \$100,000 annually because of reduced scrap, rework, downtime, and tooling savings," Shady says.

Working with IPRT was the first step toward improving the production line as a whole, Shady adds. Through previous training at CIRAS workshops and with continued assistance from

CIRAS, MAHLE Winterset has used Lean management methods to operate more efficiently.

"We used value stream mapping to identify bottlenecks and remove them," says Shady. "We were able to switch the line from ten shifts per week to five while still satisfying customer demand without any overtime."

The changes helped MAHLE retain at least 10 jobs, he said.

"It's nice to work with CIRAS because they are able to provide a fresh set of eyes to look at a problem," Shady says. "Since they help so many different companies, they



can come up with ideas we haven't even heard of while also being able to connect us with people that can make our ideas reality."

Later this year, IPRT's Company Assistance program will merge with CIRAS. The merger is intended to provide easier access to IPRT expertise for Iowa companies.

➤ For more information, contact Derek Thompson at 515-419-2163 or thompson@iastate.edu.

AT A GLANCE

Plas-Tech Tooling Inc.

LOCATION: Garner, Iowa

FOUNDED: 1993

IMPACT: Plas-Tech Tooling launched a new company, VanSon Enterprises, Inc., which produces the Bleacher Buddy, a portable stadium chair bleacher seat. Sales of this new patented product in the first year are expected to reach \$25k and \$200k in year two.

OVERVIEW: Plas-Tech Tooling, Inc. offers a wide range of services from product development and design to machining and injection molding of finished products. They also offer reverse engineering and injection mold building.

Innovative Thinking at Plas-Tech Tooling Leads to Successful Product Launch

Dean Sonquist and Paul Van Gerpen, the owner and business manager of Plas-Tech Tooling in Garner, Iowa, were sitting at a local basketball game one day when they noticed that the current range of indoor stadium seats on the market were too big and cumbersome to fit well on permanent bleachers.

And an idea was born.

Van Gerpen and Sonquist, with help from CIRAS and its partners, quickly launched VanSon Enterprises Inc. to produce the Bleacher Buddy, a portable stadium chair bleacher seat that was trademarked in December. Sales in the first year are expected to reach \$25,000 and \$200,000 in year two.

"The innovative thinking at Plas-Tech Tooling is what amazes me most," says Mike O'Donnell, director of CIRAS' Manufacturing Extension Partnership. "As an existing manufacturer with established products and services, they acted on an idea that was completely out of their purview and successfully navigated from concept to patented product in record time."

Plas-Tech Tooling, founded by Sonquist in 1993, makes injection molds and machine tooling, ranging from large production runs to individual piece needs.

"As an existing manufacturer with established products and services, they acted on an idea that was completely out of their purview and successfully navigated from concept to patented product in record time."

—Mike O'Donnell

Van Gerpen, who joined the company in August 2012, previously had participated in a FastTrac class that was offered by the North Iowa Area Community College's John Pappajohn Entrepreneurial Center (NIACC JPEC). When inspiration struck, Van Gerpen contacted NIACC's Jody East and Dan Winegarden, director of incubation and acceleration services at the Pappajohn Center, to ask about resources and support for the new product.

"We appreciate the resources and support from JPEC, taking us from original concept to prototyping to final product design," says Van Gerpen.

CIRAS ran a finite element analysis on the prototype to identify any stress points that needed to be addressed before moving forward.

Winegarden credits JPEC's partnership with CIRAS in helping speed the innovation. With funds provided by CIRAS' Economic Development Administration University Center Program, Plas-Tech gained access to the rapid prototype 3-D printer in NIACC's Tool and Die department. The printer is much quicker than tooling a machine to produce the prototype.

"This resource was invaluable to us," Van Gerpen says.

The innovative Bleacher Buddy is the newly patented product launched by VanSon Enterprises, Inc.



➤ For more information, contact Mike O'Donnell at 515-509-4379 or modonnll@iastate.edu.



AT A GLANCE

Elevate Advanced Manufacturing

FOUNDED: July 2013

WEBSITE: www.elevateiowa.com

IMPACT: In its first six months of operation, Elevate Iowa reached the milestone of 1,000 unique participants impacted by the Iowa-Advanced Manufacturing Consortium grant. They are well on their way to the grant goal of arming 2,728 Iowans with the skills they need to engage in Iowa's workforce.

OVERVIEW: Elevate Advanced Manufacturing is a statewide, integrated marketing campaign to promote careers and educational pathways in advanced manufacturing.

ELEVATE
ADVANCED MANUFACTURING

Pictured from left to right, students at work in the North Iowa Area Community College (NIACC) and Des Moines Area Community College (DMACC) Tool and Die Technology Programs.

ABI Partners to Promote Career Opportunities in Advanced Manufacturing

Iowa business and manufacturing leaders hope a new website and promotional campaign will lure more young people to manufacturing jobs and head off a projected shortage of skilled workers.

The Iowa Association of Business and Industry (ABI), working closely with the Iowa-Advanced Manufacturing (I-AM) consortium, launched the campaign last August in a bid to bridge employers with potential new workers and to improve public perception about today's manufacturing environment. The site, www.elevateiowa.com, includes video

testimonials, self-assessment career guides, job search tools, and training information.

"The Elevate Advanced Manufacturing campaign is the crucial infrastructure Iowa needs to connect industry opportunities and educational platforms with the workforce," explains Leisa Fox, ABI's senior vice president of revenue and programs.

Manufacturing, at roughly \$25.4 billion and nearly 17 percent of the Iowa economy, annually contributes the largest single portion of Iowa's gross domestic product, according to an

Iowa State University review of the most recently available economic data. As Iowa's business climate improves, manufacturers are beginning to worry more and more about whether or not they'll be able to find the skilled workers necessary to ramp up factories and meet a pent-up demand for durable

goods. The concerns are magnified by a coming wave of retirements in the manufacturing sector and by existing skilled-worker shortages in an economy focused on technology-driven manufacturing.

"This is evident in every corner of the state, both rural and urban areas,

as employers are challenged to fill their open positions," says Fox. "To get ahead of this issue, we realize the need to make manufacturing more attractive as a career and increase investments in training and skills development."

Stephanie Ferraro, project manager of the I-AM grant, a \$13 million pool

"To get ahead of this issue, we realize the need to make manufacturing more attractive as a career and increase investments in training and skills development."

—Leisa Fox

➤ For more information, contact Leisa Fox at 800-383-4224, or lfox@iowaabi.org.



Chemical Instrumentation Facility (CIF)

The CIF has more than \$5 million worth of analytical instrumentation available for industrial research and solving technical problems.

Example Applications

- Characterization and identification of synthetic organics and compounds of biological origin
- Determining molecular structures of small molecules and powders
- Determining the thermodynamics of chemical reactions
- Characterizing biomolecular reactions
- Optimizing industrial processes
- Characterization of gaseous and liquid effluents from industrial processes
- Chemical synthesis research

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Look closer at Iowa's rolling landscape and you may be surprised to discover what is made in Iowa. You will find manufacturers producing goods ranging from transportation equipment and powered machinery to quilting machines and barbecue sauce. When you buy products manufactured in Iowa, more money stays in our local communities.

Iowa Spring Manufacturing

Overview: Iowa Spring specializes in engineering, producing, and delivering premium quality springs for agricultural equipment, mechanical equipment, and the overhead garage door industry nationwide. Their unique ability to create large, heavy-duty, and completely custom products—combined with a wide variety of specialty finishing processes—ensures that every order is made with customer satisfaction in mind.

Location: Adel, Iowa

Founded: Founded in Des Moines in 1976; moved to Adel in 1979

Employees: 135



Pasquale's Food Service Inc.

Overview: Pasquale's is a frozen pizza manufacturer that also distributes its products throughout the Midwest. Customers include full-line distributors, grocery retailers, and individual businesses. Pasquale's started in 1959 with a restaurant in Fort Dodge, Iowa, and moved into the frozen market in 1984.

Location: Humboldt, Iowa

Founded: 1959

Employees: 13



Polaris Industries Inc.

Overview: Polaris designs, manufactures, and markets off-road vehicles, military vehicles, motorcycles, and low-emission on-road vehicles.

Location: Spirit Lake, Iowa; Milford, Iowa

Founded: Spirit Lake founded in 1994; Milford founded in 2012

Employees: 687



Smith-Lever Act

May marks the 100th anniversary of President Woodrow Wilson signing the Smith-Lever Act of 1914—federal legislation that established the Cooperative Extension Service, a state-by-state national network of educators that for the first time extended university-based research and knowledge to the people at large.

The law, which expanded the service role for land-grant universities, was the birth of modern university extension services. (One caveat: Iowa State Extension and Outreach [ISUEO] was “actively reaching out to the public even before 1914” through farmers’ short courses and farm demonstrations, according to the ISUEO website.)

Extension offices around the country are expected to tout the centennial during the next few months and commemorate the Smith-Lever Act in a National Convocation on May 7–8 in Washington, D.C.

Iowa State announced plans to celebrate the anniversary during Iowa State University Extension and Outreach Week at the end of March.

“Extension and outreach is about people, and education is our mission,” Cathann Kress, vice president for ISUEO said in a news release. “This celebration is one way we say ‘thank you’ to the many volunteers, community leaders, organizations, agencies, and other partners who support ISU Extension and Outreach work in Iowa.”

For more information, go to www.extension100years.net/en/administration/about_us/chancellors_office/extension.

CIRAS Welcomes New Advisory Council Members



Sandy Ehrig

Sandy Ehrig is the economic development administrator at the Iowa Farm Bureau. Since 1914, the Farm Bureau has supported rural economic development by fostering entrepreneurial growth, encouraging STEM (science, technology, engineering, and mathematics) initiatives, coordinating resource providers, and assisting with community viability efforts. Ehrig manages the Renew Rural Iowa initiative, which recognizes innovative Iowa companies and helps them find education and connections to technical and financial resources. Renew Rural Iowa has provided six years of in-kind matching for CIRAS, leveraging approximately \$2 million annually in federal funding. The Iowa Farm Bureau and Renew Rural Iowa also sponsor the EntreFest annual small business conference and Dream Big Grow Here business grant contest.



Darin Massner

Darin Massner is president and CEO of Country Maid in West Bend. Massner oversees corporate management, systems engineering, and strategic planning for the company. He participates on various local boards and advisory councils aimed at helping rural communities grow, including the Kossuth Regional Hospital Management Council and West Bend Economic Development board. Country Maid has manufactured frozen pastry dough products since 1991. The company sells products in more than 45 states through a network of more than 70 dealerships. Country Maid also supports its dealerships through business development classes and by developing operational systems to meet dealerships’ needs. Country Maid is an ESOP (employee stock ownership plan) company.



Grace Swanson

Grace Swanson is vice president of human capital at Accumold in Ankeny. Accumold is a high-tech manufacturer of precision micro-, small-, and lead-frame injection molded plastic components. Using the company’s Micro-Mold technology processes, Accumold designs, builds, and produces unique molds and components for manufacturers with microelectronics, medical, micro-optics, automotive, and military applications. At Accumold, Swanson focuses on recruiting and developing employees who fit the company’s culture and brand. She previously worked in various positions for the Des Moines Area Community College, Pella Corporation, and Tellabs. Swanson also has contributed to books on Lean manufacturing and the role of women in management and has served in various community leadership roles.



Krista Taylor

Krista Taylor is vice president at Taylor Construction, a highway and heavy construction company that has operated in eastern Iowa for 42 years. The company specializes in providing customized solutions for bridge construction, dam renovation, underground concrete structures, foundation stabilization, and flood mitigation projects in Iowa and Wisconsin. Taylor works primarily with the Iowa Department of Transportation and with city and county municipalities. The company has been recognized for excellence in safety four times by the Associated General Contractors of Iowa and also has been recognized for its design of precast/prestressed concrete.

AT A GLANCE

Kreg Tool Company

LOCATION: Huxley, Iowa

EMPLOYEES: About 150

FOUNDED: 1990 (founder Craig Sommerfeld started selling his Kreg Jig in 1989)

IMPACT: Kreg made a “multimillion-dollar” investment after part of CIRAS’ training about the innovation cycle.

OVERVIEW: Kreg Tool Company helps both serious woodworkers and aspiring home improvers deliver the projects they want by providing the tools to help them get started, keep projects simple, and grow their skills.

CIRAS Innovation Services Stimulate Major Investment at Kreg Tool Company

Kreg Tool Company is now spending millions of dollars to develop and promote a new home-improvement kit after completing part of an innovation cycle process led by CIRAS.

Tony Hogan is chief operating officer at the Huxley-based tool company, which is best known for its innovative Kreg Jig. The nearly 25-year-old firm has seen consistent growth during the past few decades, but Hogan and other company leaders have a plan that calls for Kreg to triple its sales over the next 10 years.

Getting there, according to Hogan, means Kreg Tool must focus on gradually building sales volume and financial strength. The goal is to grow 15 percent each year while launching no more than five high-impact new projects.

“We went to CIRAS to learn how to become more innovative and learn if there was a formal process we could use so we could have the appropriate tools in our toolbox to grow the company effectively,” Hogan says.

CIRAS introduced Kreg to its innovation cycle services—a four-phase process of definition, discovery, development, and delivery that helps companies establish a formal approach to innovation.

Since Kreg has always been proficient at developing and commercializing new

products, Hogan and CIRAS primarily sought to improve the first two innovation cycle phases—definition and discovery. During the definition phase, ideas are captured and refined based on customers’ interactions. In the discovery phase, new concepts are evaluated to confirm their value to the customer and the company.

These first two phases of the innovation cycle require much planning, brainstorming, testing, failing, and refining, but the phases ultimately can help companies reduce the time, money, and risk of innovation. “It takes bias and favoritism out and allows companies to make data-driven decisions,” says Chris Hill, CIRAS project manager.

CIRAS facilitated sessions with Kreg leaders to develop and communicate new ideas and then select the most viable and valuable options to pursue. CIRAS gave Kreg a series of tools to document new concepts and evaluate potential value. These tools standardized the innovation process to ensure each new concept addresses critical factors such as competitive advantage, strategic fit, and value proposition to the customer.

Hogan says the tools CIRAS provided have given Kreg a platform to train employees on the strategic-thinking process of developing ideas. Additionally, it helped Kreg sort through more than 100 ideas and focus on 3 that should receive resources for development. “It gave us more confidence that the projects we already were thinking about were the right projects,” Hogan adds.

As a result, Kreg is now making a multimillion-dollar investment in a new home-improvement kit. The kit bundles three existing products into a comprehensive one-stop solution for customers. According to Hogan, the investment covers the costs of new equipment, project plan development, end-user experience research, and creation of sales and marketing materials.

Two other projects—a revised pocket-hole jig and a new home-improvement center—also are working through the innovation cycle phases. “We are well on our way to achieving or exceeding our financial objective with the first round of projects we’ve brought through the definition and discovery process,” Hogan says.



Two employees package tools at Kreg Tool Company in Huxley, Iowa.

➤ For more information, contact Chris Hill at 515-313-8251 or chhill@iastate.edu.

CIRAS-Sparked Partnerships between Students and Industry Boost Businesses' Economic Impact by \$17 million

Student-industry collaborations involving the Iowa State University campus have spawned millions of dollars of benefit for Iowa companies by helping the firms increase efficiency, cut costs, build better products, and plan more strategically for the future.

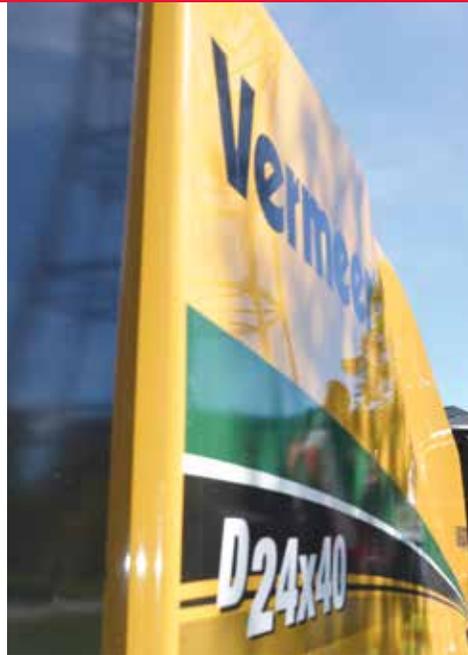
Iowa State statistics show engineering students worked on 53 projects in 2012 for 27 different companies. Surveyed companies later reported an economic impact from that work totaling more than \$17 million.

Carey Novak, a CIRAS project manager, believes the true benefit of those relationships might actually come long after the projects themselves are completed. Many Iowa companies are using students to solve problems that could lead to innovative or greatly improved new products.

"The true value in these isn't necessarily the discreet projects," Novak says. "It's that these companies are thinking longer term."

CIRAS connects Iowa companies to Iowa State students for roughly 60 industry projects each year in disciplines such as engineering, design, business, and agriculture and life sciences. Most are real-world "capstone" projects that students are required to complete before graduation. The projects essentially become one- or two-semester-long job interviews for students, since many firms ultimately hire students for full-time positions.

"The projects help students develop their workplace competencies in a



professional environment and allow them to receive mentoring from working professionals," says Jackie Baughman, senior lecturer in mechanical engineering and a former lecturer in agricultural and biosystems engineering. Baughman and other Iowa State University faculty who seek to include such projects in their courses work with CIRAS to initiate and coordinate it all.

"Our role is based on the ability to listen to both sides for areas of technical interest and willingness to collaborate," says Novak. "We look at the common areas and suggest project ideas, and then we help facilitate the projects within the university."

Baughman and other Iowa State University faculty who seek to include such projects in their courses work with CIRAS to initiate and coordinate it all.

"Our role is based on the ability to listen to both sides for areas of technical interest and willingness to collaborate," says Novak. "We look at the common areas and suggest project ideas, and then we help facilitate the projects within the university."

Student Projects Impact Vermeer

Vermeer Corporation, which is based in Pella and has a satellite office in the Iowa State University Research Park, is one company CIRAS, students, and faculty work with routinely. Two recent projects included efforts to streamline a production facility and improve the "air-ride" cab suspension system for an excavation machine.

AT A GLANCE

Vermeer Corporation

LOCATION: Pella, Iowa; with manufacturing facilities in Freeman, S.D., and Beijing, China

EMPLOYEES: More than 3,000 team members at Vermeer and associated organizations

FOUNDED: 1948 to manufacture agricultural and industrial equipment



The facility planning project involved juniors and seniors in Baughman's course. Cory Plants, manufacturing engineer at Vermeer, says the goal was to improve material flow and reduce floor space on the production line for the Underground segment's Machine After Weld cell, which includes six large horizontal and vertical machining centers.

Students "came up with a solution that would save floor space by 20 percent and part-flow travel by 26 percent," Plants says. "The floor space reduction ... allowed us to also add subassembly into the same footprint." Vermeer is now looking at student proposals for possible additional improvements.

The second project involved mechanical engineering students who were asked to design, model, and analyze a way to improve comfort for operators of a Vermeer Terrain Leveler surface excavation machine. A Vermeer team is now working with the students' design and has resolved several issues identified by the students. Field testing of the resulting prototype started in February.

➤ For more information, contact Carey Novak at 515-408-4257 or cenovak@iastate.edu.

Jackie Baughman sees herself as a facilitator to help Iowa State University students make a positive mark on Iowa businesses.



Baughman, a senior lecturer in mechanical engineering and former lecturer in agricultural and biosystems engineering, works regularly with CIRAS to find potential capstone projects for her students and to evaluate the impact of that work. She considers the student-industry projects for her Lean manufacturing systems and facility planning courses to be an essential part of the curriculum.

“The ultimate goal is for students to understand customers’ needs and utilize tools introduced into the course to achieve an outcome the client wants,” Baughman says. Students are challenged through the projects to act professionally while using communication, creativity, teamwork, and problem-solving skills—lessons that can’t be replicated in a classroom alone.

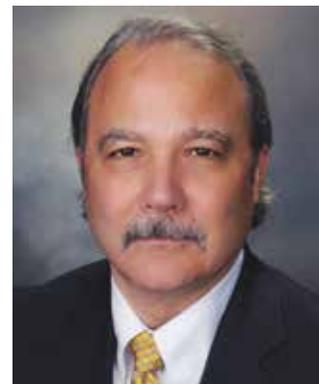
Baughman uses professional memberships available through CIRAS to network with Iowa business leaders and Iowa State alumni. Many student projects come as a result—for example, a recent Iowa Lean Consortium event resulted in a student project with Mercy Medical Center—and many first-time clients later return for more work.

Baughman says her relationship with CIRAS is important. CIRAS helps ensure that Baughman and her students fill out the appropriate contracts, and it helps fund student travel during the courses so students can meet on-site with their company mentors. In return, Baughman shares information with CIRAS about companies she works with, so CIRAS can connect those companies to additional resources.

Prior to joining the Iowa State faculty, Baughman worked in product and process development and continuous improvement at U.S. Steel, the U.S. Can Corporation, and the Harley-Davidson Motor Company. She earned her bachelor’s degree and PhD from Iowa State and an MBA from the Keller Graduate School of Management.

Michael Corum, 58, Made Businesses Better

Michael Corum, an artist, poet, and manufacturing troubleshooter, died in January after losing a battle with pancreatic cancer. He was 58.



Michael Corum

Corum, who became a CIRAS account manager after long stints of employment with Pella Windows and Vermeer Manufacturing, had made valuable impact with CIRAS through his contact with clients in western Iowa.

“Although Mike was only employed at CIRAS for two months, he had already become a valuable part of our team,” says Mike O’Donnell, director of the Manufacturing Extension Partnership program and Corum’s supervisor. “We miss him.”

Mike is survived by Jaxine Corum, his wife of nearly 35 years; two sons; a daughter; two sisters; and his father, as well as various nieces, nephews, and pets.

Corum, who was born in Cedar Rapids, received a bachelor’s degree in economics and business administration from Coe College in 1978, followed by an MBA from Drake University in 1986. A published poet and contest winner, he began work in 2012 on a master’s degree in creative writing with a focus on poetry at the University of Nebraska.

Corum worked for Ford Motor Company in Detroit for two years before launching an 18-year career with Pella Windows beginning in 1980. He later became an industrial distribution manager for Vermeer, a position that allowed him to travel extensively around the globe.

He was a magician, a marathon runner, and a proud Democrat. He started his new career at CIRAS last year, shortly before doctors found the cancer.

“Mike told me that his job at CIRAS was something he should have been doing all his life,” Jaxine Corum told his coworkers. “He really loved helping companies succeed.”



An original painting by Mike Corum.

Five Iowa Women Awarded as Among Manufacturing's Best

Five Iowans were among the 160 women honored by The Manufacturing Institute in February as recipients of the 2014 Woman in Manufacturing STEP Awards. The awards, given to women who have "demonstrated excellence and leadership in their careers," reflect people with a wide variety of accomplishments. One recipient, Candace Drahn, is the vice president of sales and marketing at M's Machine and Manufacturing Company Inc. She was profiled in a Winter issue of CIRAS News.

The other Iowans are:



Karen Buerkle

Project Manager, Drivetrain Operations at John Deere Waterloo Works

According to The Manufacturing Institute, Buerkle has used her "exceptional educational background as a springboard to hone her technical skills and develop interpersonal and management skills" as her responsibilities have grown at John Deere. She currently is responsible for developing approximately 50 new machine tools and 150 machine moves with a budget of \$32 million over two years.

"Love what you do. Manufacturing has a lot of opportunities for this; it's competitive, active, and technologically advanced. There are many different roles to stimulate you. Remember to do every job the best you can, treat everyone with respect, and stay optimistic—and you will make an impact."



Alicia Kuhlman

Senior Structural Analyst at Vermeer Corporation in Pella

The institute described Kuhlman as an "avid learner who continues to look for ways to help her team better serve their customers." Kuhlman is enthusiastic about promoting engineering as a career for women. Since taking on a leadership role at Pella, she has increased her team's analytical capacity through hardware and software improvements and through the introduction of computational fluid dynamics.

"I'm passionate about manufacturing because there are always opportunities for personal growth—learning never stops in this industry."



Maureen "Mo" Lockwood

Manufacturing Manager at Thombert Inc. in Newton

The institute credited Lockwood with providing leadership to improve Thombert's productivity through "a combination of improved methods and investment in new technology." Productivity has increased an average of 7 percent a year during the last three years, and the company has saved more than \$500,000 annually due to her "direction and coaching" to reduce manufacturing scrap.

"My passion for manufacturing comes from the collaborative culture of continuously improving results...I thoroughly enjoy working with colleagues at all levels of the business to achieve things that once seemed impossible."



Wanti Muchtar

Senior Metallurgical Engineer at Vermeer Corporation in Pella

The institute praised Muchtar's "outstanding technical expertise" and said her "thorough analyses have resulted in large cost savings and in the improvement of machines for better performance.... She also is considered a driving force behind the company's brand promise of being 'Equipped to Do More,' with her efforts on new, patentable processes that will save money and offer a competitive advantage."

"Growing your career in manufacturing is a great way to use and contribute your knowledge toward creating value-added product that drives the economic growth in your country."

Changes in Iowa's Manufacturing Landscape by Liesl Eathington

Iowa began 2013 with manufacturing employment levels just 5 percent lower than they were in 1990. That's relatively stable in comparison to national manufacturing employment, which was 35 percent lower in 2013 than in 1990. However, the distribution of Iowa jobs changed dramatically during that time.

Manufacturing employment in Iowa has expanded and contracted several times in recent decades. Sustained job growth during the 1990s was followed by a steep decline in the early 2000s. Manufacturing jobs began to come back in 2003, but the growth had trailed off by 2006 and turned sharply negative from 2006 through 2009. Iowa has been gradually regaining manufacturing jobs since 2010. These trends are illustrated in Figure 1.

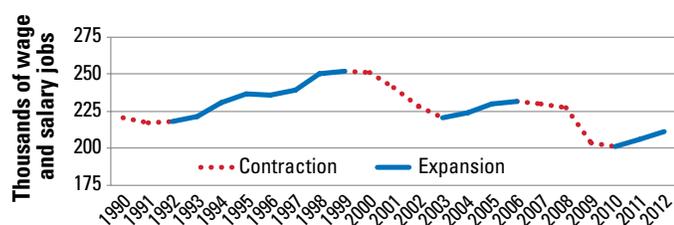


Figure 1

These employment dynamics played out unevenly across Iowa's metropolitan and nonmetropolitan landscape. In 1990, Iowa's manufacturing jobs were distributed almost equally between its metro and nonmetro territory. The 1990s were kinder to nonmetro areas, with nonmetro counties capturing 75 percent of the new manufacturing jobs added between 1992 and 1999.

Nonmetro areas also fared slightly better than metro areas during the steep job declines from 1999 through 2003. Metropolitan areas lost about 16 percent of their manufacturing jobs, while nonmetropolitan Iowa lost 14 percent.

Conditions since 2003 have been less favorable to Iowa's nonmetropolitan areas. As the state added manufacturing jobs from 2003 through 2006, its nonmetropolitan counties captured less than half of that growth. The subsequent downturn was worse. Nonmetro areas suffered 70 percent of the job losses between 2006 and 2010.

Iowa's nonmetropolitan territory ranges from sparsely populated rural counties to more urbanized micropolitan areas. A micropolitan statistical area contains an urban center with 10,000 to 49,999 residents. Iowa's micropolitan areas include some of its most well-known manufacturing centers such as Clinton, Fort Dodge, Keokuk, Mason City, Muscatine, Newton, Ottumwa, and Storm Lake. The full list of micropolitan counties includes Boone, Buena Vista, Cerro Gordo, Clay, Clinton, Davis, Des Moines, Dickinson, Jasper, Jefferson, Lee, Mahaska, Marshall, Muscatine, Wapello, Webster, and Worth.

These areas held a steady 23 percent share of Iowa's manufacturing jobs from 1990 through 2003. But after 2003, their position began to erode. The brief manufacturing recovery from 2003 to 2006 yielded comparatively weak job gains in micropolitan regions, and they captured only 8 percent of statewide manufacturing job growth during that time. The following years were worse, as the micropolitan areas bore 28 percent of statewide losses from 2006 to 2010.

Iowa's micropolitan counties have fared better more recently, capturing 16 percent of manufacturing jobs added since 2010. However, they continue to lose ground relative to other regions in the state. By 2012, their overall share of Iowa's manufacturing jobs had fallen to 21 percent. Figure 2 illustrates the percentage shares of manufacturing jobs, job gains, and job losses by county type through recent manufacturing sector business cycles.

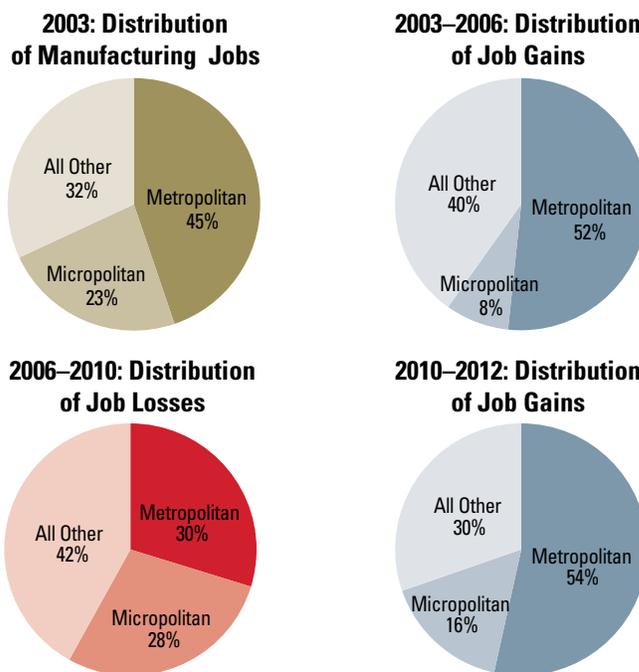


Figure 2

The last two decades have brought marked changes to manufacturing in Iowa. Growth seemed to favor the state's nonmetropolitan areas during the 1990s. Since 2003, however, Iowa's metropolitan economies have appeared slightly more attractive for manufacturing job growth and more resilient to decline. Metro shares of manufacturing jobs are now up to 48 percent, similar to 1990. Meanwhile, some of Iowa's most traditional manufacturing centers have struggled to recover jobs lost during the last recession. Only time will tell if these trends continue.



Digital Lab for Manufacturing

United States officials recently announced plans for a \$320 million Digital Lab for Manufacturing that includes a “Tier 1” partnership with Iowa State University. The lab will be built by UI LABS, a Chicago-based research and commercialization collaborative, and is intended to be a flagship research institute for design innovation. It will use expertise from Iowa State’s Center for e-Design, the Virtual Reality Applications Center, and the Center for Nondestructive Evaluation. As a partner, Iowa State will have a say in lab operations and funding decisions.

“We are pleased to share our expertise with UI LABS, industry, fellow researchers, and educators from around the nation in the new Digital Lab. This is public-private partnership on a grand scale—one capable of providing the significant resources and talents to advance research, effect change for manufacturers large and small, and prepare the next generation for the multifaceted demands for a new type of workforce.”

—Janis Terpenny

*ISU Director of the Center for e-Design;
Department Chair, Industrial and
Manufacturing Systems Engineering*

CIRAS to Help Iowa Companies Find Growth via New Technologies

Iowa State University and CIRAS seek to use new technology to spark economic development across the state. A major new effort in that regard was launched on April 15, when a federally funded and CIRAS-directed program hosted its first Manufacturing Innovation Summit.

Iowa State’s Economic Development Administration University Center Program (EDAUCP) is funded by a five-year grant from the U.S. Department of Commerce. The EDAUCP plans to host a summit each of those years, focusing on a different manufacturing subsector each year. First up is the plastics industry.

“The focus of this program is to support technology commercialization and promote high-wage job growth in Iowa,” says Shankar Srinivasan, CIRAS EDAUCP director. The Plastics and Rubber Manufacturers Innovation Summit was intended to link Iowa manufacturers to researchers and subject experts, plus any university ideas, processes, or methodology that might be worth manufacturers investigating or adopting. Afterward, Iowa State and CIRAS will help incubate any plausible ideas until they are ready for business use. The goal is to make manufacturers more profitable.



- **ABI Business Succession—What’s Your Exit Strategy?**
April 23, 2014 • 1:00 p.m.–6:00 p.m.
Mason City, Iowa
- **Theory of Constraints: What Is the Goal?**
April 24, 2014 • 9:00 a.m.–3:00 p.m.
Marion, Iowa
- **Internet Marketing Strategy Boot Camp**
April 29–May 1, 2014 • 9:30 a.m.–4:00 p.m.
Johnston, Iowa
- **Video Marketing Boot Camp**
May 5–6, 2014
Johnston, Iowa
- **Midwest Small Business Government Contracting Symposium**
May 7–8, 2014 • 8:00 a.m.–4:30 p.m.
Moline, Illinois
- **ABI Local Leaders Forum**
May 8, 2014 • 1:00 p.m.–4:00 p.m.
Sioux City, Iowa
- **Lean 101: Simulation for Manufacturers**
May 15, 2014 • 8:00 a.m.–4:00 p.m.
Webster City, Iowa
- **Community Cybersecurity Tabletop Workshop**
May 21, 2014 • 8:30 a.m.–4 p.m.
Des Moines, Iowa
- **Outclass Your Competition: Business Etiquette and Dining Tutorial**
June 2, 2014 • 8:30 a.m.–2:30 p.m.
Des Moines, Iowa
- **ABI 2014 Taking Care of Business Conference**
June 9–11, 2014
Cedar Rapids, Iowa
- **EXPORTECH™: An Export Acceleration System for Achieving Profitable Growth**
Three sessions: June 10, 2014; July 9, 2014; August 13, 2014
West Des Moines, Iowa

For details, see the events section of the CIRAS website, www.ciras.iastate.edu.

CONTACT INFORMATION



Since 1963, we have been improving the profitability of businesses. We partner with companies and communities to help them prosper and grow. A typical partner achieves a 2,000 percent return on its investment—an astonishing \$20 of impact for every \$1 invested. A vast network of university and industry experts brings years of professional experience to CIRAS, making us a leading integrator of solutions in Iowa, contributing more than \$1.8 billion of reported impact during the past five years.

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THE INNOVATION CYCLE

Leveraging the Innovation Cycle: Delivery *by Chris Hill*

For an idea to become an innovation, it must pass through the four phases of the innovation cycle: Definition, Discovery, Development, and Delivery. In this article, the last of those four phases, Delivery, is discussed.

In the Delivery phase, we bring the previously identified valued product or service to the marketplace and generate sales. A key step in this process is ensuring that the entire value chain is ready and able to achieve the specific goals identified during previous phases. This includes supply chain readiness, internal readiness, marketing and sales materials, and service readiness.

Supply chain readiness focuses on making sure there's an ongoing supply of quality items available to the company. The team will verify that suppliers understand sales plans and have access to material to ensure a disruption-free flow of material. They will also ensure adequate quality planning is in place that reflects key performance requirements of the product or service. Finally, the team will verify that current performance monitoring systems are ready for new suppliers and new part numbers. All of these items and others are typically covered during joint supplier readiness reviews that start during the Development phase, but they intensify as the project enters the Delivery phase.

Internal readiness focuses on the company's ability to execute. The team ensures that employee training has been completed, work instructions and any special material handling needs are documented, and all quality planning is completed and ready for the production start-up.

Marketing and sales materials are key elements the project team ensures are a true representation of the product or service. No one, including customers, likes to be offered one thing only to be given something different.

Service readiness can be a great tool to maintain customer loyalty over time. Undesirable things happen, but the ability to address them quickly and correctly might be the only chance to win a customer a second time. The project team will focus on key elements like ensuring required service parts are available, service tech training has been completed, and service manuals are available.

You may have noticed that "verify" and "ensure" are used many times when discussing the Delivery phase. This phase is mainly an execution of plans developed during the earlier phases, so the project team is in a verification mode of work completed to bring the valued product or service to the marketplace.



To participate in the innovation discussion, join our LinkedIn group at [linkd.in/12tVLy1](https://www.linkedin.com/group/12tVLy1).