



Civil Matters

Kansas State University Department of Civil Engineering

April 2011, Volume 9, Issue 1



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The redesign of Civil Matters was led by CE senior Rachel Spicer, Shawnee, Kan., who donned multiple hats of graphic artist, layout designer, reporter, photographer, and editor of the newsletter.



Message from the department head

Greetings from the Little Apple!

It is my pleasure to reach out to you through our annual newsletter, Civil Matters. This issue has a new look and credit for that goes to CE senior Rachel Spicer, (Shawnee, Kan.); solo reporter and graphic designer behind this transformation.

Last fall, I began my appointment as K-State CE's seventh department head and inaugural Dr. Robert Snell CE Alumni Professor, stepping into the shoes of CE Professor Yacoub Najjar who served as the interim head for two years. Since then I have enjoyed working with CE faculty, staff and students, the college and university's leadership teams, and the CE advisory council to advance our educational, research and outreach programs. In the past months I have also enjoyed meeting several CE alumni and supporters, heard alumni stories about college days spent in Manhattan, and discussed the strengths and potential of K-State CE.

We are truly proud of your support.

The year 2010 has been another year of accomplishments and successes for us. We celebrated 100 years of our first graduating class of seven young men who collected



their CE diplomas in 1910, saw our highest total enrollment and the biggest freshmen class in recent history, and granted a record 40 masters degrees. The ASCE Steel Bridge team placed first in the regional competition and traveled to nationals in West Lafayette, Ind. Graduate student Lisa Beck was awarded a prestigious \$10K scholarship by the American Association of University Women. CE Associate Professor Sunanda Dissanayake received a Fulbright Scholar award to conduct research and establish a scholarship in Sri Lanka, Associate Professors Hayder Rasheed and Steve Starrett were elevated by ASCE to Fellow grade, Associate Professor Dunja Peric received an Eminent Scholar's Visiting Grant from Australia's University of New

South Wales, and Assistant Professor Kyle Riding was awarded a Big 12 Faculty Fellowship. The year 2010 also saw Associate Professor Asad Esmaily publish his first text book about reinforced concrete columns while Esmaily, Dissanayake, and CE Professor Bobb Stokes were appointed to editorial boards of prestigious professional journals.

The year 2011 promises to be equally exciting. CE has launched a \$100K upgrade of the mechanics of materials laboratory and preparations are in full swing for two major events - the ASCE regional competition in Manhattan in the spring, and a visit by the Accreditation Board of Engineering and Technology in the fall.

I invite you to read the entire issue of Civil Matters to learn about student activities, alumni stories and exciting research projects at K-State CE. Plan a visit to Manhattan and our faculty, staff and students will be happy to show you around.

Go Cats!

Alok Bhandari

Alok Bhandari
Department Head and Dr. Robert
Snell CE Alumni Professor



Professor named Fulbright Scholar

CE Associate Professor Sunanda Dissanayake was awarded a Fulbright Scholar grant to teach and conduct research at the University of Peradeniya, Sri Lanka.

The Fulbright application process involved evaluation by the Fulbright Commission and an equivalent commission in Sri Lanka.

The Fulbright Program is the flagship international educational exchange program sponsored by the U.S. government and is designed to increase mutual understanding between the people of the United States and the people of other countries. The U.S. scholar program sends approximately 1,100 American scholars and professionals per year to around 125 countries, where they lecture and/or conduct research in a wide variety of academic and professional fields.

Dissanayake will be teaching and assisting with curriculum enhancement in Sri Lanka for seven months while



conducting research on reducing highway fatalities and injuries. The issue is sizable in Sri Lanka, as in many other developing countries, because of the mix of vehicular, pedestrian and other traffic on poorly designed roadways. Dissanayake has conducted similar research on United States roadways for a number of years. Dissanayake is considering establishing a study abroad program for engineering students. The free education system in Sri Lanka means that financial responsibility would be limited to living and travel expenses. She also hopes to develop some collaborative research efforts between the two countries.

Student receives fellowship

Civil engineering graduate student Lisa Beck (BSARE '09) received a \$10,000 Selected Professions Fellowship from the American Association of University Women for the 2010-2011 school year. Beck was one of 21 students in the nation to receive the fellowship.



how the incorporation of industrial by-products affects concrete's durability and resistance to freezing and thawing.

The association's Selected Professions Fellowship has been advancing female graduate students like Beck since its establishment

in 1970. The fellowship provides women with opportunities to pursue graduate degrees in fields where females are typically underrepresented, including law, medicine, science, technology, architecture, mathematics and engineering.

Beck said she could not have received the fellowship without the opportunities K-State provides to its engineering students.

To be considered for the honor, Beck had to submit four essays explaining her course of study, leadership and involvement at K-State; body of research; and professional goals. She also had to provide a narrative autobiography, three letters of recommendation and other information.

Beck is using the fellowship to conduct research at K-State investigating

CE Senior named St. Pat



Each year the Open House parade ends in Bosco Plaza where engineering departments put on their skits and awards are announced. In 2010, civil engineering senior Chad Banka, Overland Park, Kan., was announced as St. Pat. Three men and three women in engineering are selected by the Steel Ring Society as nominees for St. Pat and St. Patricia. Nominees are selected based on GPA, leadership and involvement in the college.



XE welcomes new members



Jose Don Juan, Liberal, Kan., helps mentor freshmen students in CE 101 with their final project.

Chi Epsilon elected new officers in spring 2010 and teamed up with the U.S. Army Corps of Engineers for their biannual service project. The chapter went to several playgrounds around Tuttle Creek Lake laying down fresh mulch.

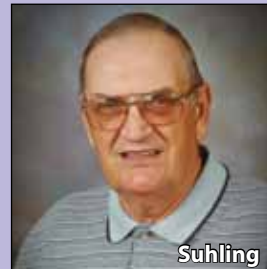
CE Assistant Professor Kyle Riding and department head Alok Bhandari helped start a freshmen mentoring program through the CE 101 class. Ten mentors helped two to three groups of students with their project,

enrollment and civil engineering-related questions. The civil engineering department allocated \$890 toward the mentoring program.

Three student members attended the National Conclave meeting March 11-12 in Kansas City, Mo. The 2011 conclave is being hosted by the University of Missouri - Kansas City.

This spring Chi Epsilon plans to team up with the Corps of Engineers again to lay mulch at the parks near the dam.

CE shop research technologist retires



Suhling



Benteman

In December 2010, after seven years serving as the research technologist in the CE department shop, Dave Suhling retired. Suhling, originally from southern Illinois, also served as the civil engineering environmental health and safety point of contact for the College of Engineering standing committees. He assisted with numerous student and faculty research projects and helped restore an 1800s

hose cart for the Manhattan Fire Department Retiree Association.

Ryan Benteman (BSMET '10) started as the new CE shop research technologist in January of 2011. Benteman's main goal is to help facilitate K-State becoming a top research lab in the nation by supporting faculty and graduate students, and updating the shop with new technologies to help match the needs of the growing field.

ASCE continues strong membership

The Kansas State Student Chapter of the American Society of Civil Engineers has been quite busy over the past year. Local and national membership numbers are at an all-time high and the group has been busy with several projects. The two largest activities have been a large service project in Wamego and preparing for the 2011 Mid-Continent Regional to be hosted at K-State.

The chapter has also been able to increase membership participation throughout all class levels. In the past, juniors and seniors have been the most active members, but the freshman and sophomore participation has increased dramatically. Part of this is most likely due to

having one of the largest freshman classes in recent history.

ASCE has also presented several leadership and development opportunities to students, including design team involvement, workshops and social events. Two of our bi-annual events, the K-State/KU joint dinner and a chapter picnic, had record high attendance as well. K-State hosted the joint dinner in November where Art Hortua and Andrew Lack of Thornton Tomasetti spoke about the new Kansas City Wizards' stadium 'Livestrong Sporting Park' in the Village West development.

Besides membership and other involvement, the chapter has been

changing its appearance. The newsletter handed out at every assembly went through a couple minor redesigns after a full makeover the previous year.

Jordan Dettmer (BSCE '10) created the chapters' new logo that can be seen on the K-State ASCE website, www.engg.ksu.edu/asce/.

Practitioner advisor Dave Karnowski and lifetime honorary member Bob Thorn have supported the chapter by showing up to assemblies and activities, as well as answering any questions students have had.

A steel bridge team member welds together webbing between two leg members of "Steel Willie V", the 2009 bridge.





Left to right: 2010 CE advisory council members: secretary, **Gregory Weathered** (HNTB Corporation); **Jon Nelson** (Tetra Tech); **Cathy Ritter** (Constellation Design Group, Inc.); chair, **Vicki Scharnhorst** (Kennedy/Jenks Consultants); vice-chair, **Keith Warta** (Bartlett & West, Inc.); **John Ahern** (EvapTech, Inc.); **Robert Thorn** (Finney & Turnipseed LLP, retired); **James Tadtman** (Wildcat Construction Co., Inc.); **Karla Waters** (Wilson & Co., Inc.); **Larry Emig** (KDOT, retired); and **Greg Allison** (MKEC Engineering Consultants, Inc.)

80^s Keith Warta

Originally from Newton, Kan., Keith Warta is K-State purple through and through. He was a 4th generation K-State graduate when he finished his CE bachelor's degree in 1984 and his children are continuing the tradition into the 5th generation. Warta was "just about banned" from the family when he decided to pursue his master's at KU, but after being a Jayhawk for a brief while, he still goes back to Manhattan, Kan., to watch football and basketball games.

Beyond sports, Warta's favorite thing to do is spend his time with his wife, son, and daughter. He runs and bikes, working his way up to participate in a triathlon someday. As if these things don't keep him busy enough, he is currently serving

as the vice-chair for the CE advisory council and is president of Bartlett & West, Inc.

Warta is hoping to help Bartlett & West grow, making it become a company of choice for employees and clients, through community and charity. To people like Warta, engineering is more than just designing projects, it's about a commitment to the public and helping to improve peoples' lives.



Letter from the chair

This is an exciting time to be involved with K-State's department of civil engineering. CE undergraduate enrollment is at an all-time high, reflecting the strong program built over the years. Our ability to attract

and retain top faculty, students and grants has never been better. The 12-member civil engineering advisory council has a strong interest in engineering education and shares a commitment to the development, advancement and recognition of Kansas State University as an outstanding institution of engineering.

In our mission, we are working closely with Dr. Alok Bhandari, department head, in positioning K-State to be recognized nationally as a top public research university, as well as providing a highly ranked education. Council members, who are comprised of recognized CE alumni, work with the university and industry to support ongoing



accreditation of the program, assist with faculty recruitment and partner with the KSU Foundation to raise funds for faculty recognition, program enhancement and student enrichment activities. We

know that active alumni engagement greatly strengthens a student's experience while on campus and enhances professional opportunities upon graduation. KSU CE graduates remain in high demand in the market and have gone forth to do great things for civil society. CEAC remains very proud of, and passionately engaged with, the KSU department of civil engineering.

Warm regards,

Vicki Scharnhorst (BSCE '82)

Blast from the past - through the decades

00s

LJ Dickens

Some people believe engineering is about sitting behind a desk, crunching numbers and looking at plans, but not L.J. Dickens (BSCE '06, MSCE '08). One of his favorite experiences through engineering has been performing bridge inspections and being outdoors. As an undergraduate student he was very involved in ASCE, a member of the steel bridge team for five years (serving as a co-captain his last year), and helped teach and grade the Mechanics of Materials class.

After obtaining his BSCE, Dickens stayed at K-State for his master's, working with CE Professor Hani Melhem, investigating old truss railroad bridges. He completed his master's degree and was hired by HNTB shortly thereafter.

When not at work, Dickens enjoys hunting, fishing and running with his wife, Tracy. He has participated in several 10k runs and half-

marathon races, hoping to compete in a full marathon in the future. Although currently living in Kansas City, Dickens hopes to return to the 'Little Apple' where using his season football tickets would require less travel.

He is also an active member of the Structural Engineers of Kansas & Missouri (SEAKM), enabling him to learn about a wide range of structural and geotechnical engineering topics and socially network. Currently, Dickens is preparing for the PE exam in April. After his PE, he plans to take the SE and obtain an MBA.



90s

Emily Wicoff

Emily Wicoff, PE. (BSCE '98), is the founder of Two Fish Foundation, Inc., a non-profit organization dedicated to implementing culturally and economically feasible aquaponic facilities in developing nation communities. Aquaponics is an agricultural practice combining aquaculture (fish farming) with hydroponics (growing plants in water, without soil). Two Fish is in partnership with a U.S.-founded/Africa-based ministry in northern Uganda that will assume ownership of the first facility.

Wicoff's ongoing graduate research at K-State focuses on facility design and water quality and treatment. She acknowledges the continuous support of the department of civil engineering.

"The department faculty has played a crucial role in the realization and further development of Two Fish Foundation, while also providing the opportunity to complete my academic goals," she said.

Having always been interested in mission and humanitarian efforts, her first introduction to international work was as a volunteer with Engineering Ministries International. Her career experience as a site development consultant state side, coupled with time spent in Iraq in support of the U.S. Army Corps of Engineers' reconstruction efforts, have further influenced her current endeavors.

In her spare time, Wicoff enjoys spending time with family, reading and photography.



80s

Tim Mulcahy



For most college students, all nighters mean staying up with the aid of caffeine to study for a big exam, but not for Tim Mulcahy (BSCE '83). As a K-State student, he would frequently travel to the Rocky Mountains with friends to go on all-night snow skiing trips. Nowadays he travels to New Hampshire, Vermont or Maine to ski and hike with his wife and three children.

Mulcahy, originally from Prairie Village, Kan., came to K-State in pursuit of his B.S. in civil engineering. After graduating, he did not want to pursue his M.B.A., so he enrolled in the accelerated law program at KU.

Following three straight summers and four semesters, he was certified to practice law in both Kansas and Missouri. He started as legal counsel in a small firm and eventually worked for a national firm where he realized he did not enjoy working for large companies.

In 2001, Mulcahy started Metropolitan Development Group. They mainly focused on multi-family developments and apartments along the East Coast. Six years later, Red Brick Development opened its doors in Washington, D.C., under his direction, focusing on multi-family developments. "I always wanted my own company," Mulcahy said, "whether it worked or didn't."

UTC aims for Tier I

The University Transportation Center (UTC) in the department of civil engineering at Kansas State University is a multi-disciplinary research organization dedicated to bringing together transportation professionals, educators and researchers to identify rural transportation problems—and to solve them. The theme of the K-State UTC is the safety and sustainability of rural transportation systems and infrastructure. UTC researchers work on three primary topics widely recognized as critical challenges facing the transportation systems of our nation — safety, sustainability and infrastructure.

Since 2005 the K-State UTC has received more than \$6 million of funding from federal sources such as the U.S. Department of Transportation's (USDOT) Research and Innovative Technology Administration (RITA) and USDOT's High Priority Demonstration funds, as well as state sources such as the Kansas Department of Transportation's (KDOT) K-TRAN Program.

According to CE Professor Robert Stokes, director of UTC, over the past five years the UTC has supported more than \$1.2 million of research at K-State, awarded 19 scholarships, 10 graduate research assistantships, and about 50 student travel grants to support research and education related to civil and

transportation infrastructure. The center helped establish an undergraduate option in transportation and materials engineering within civil engineering and a graduate certificate program in transportation engineering, also available through the Division of Continuing Education. It has sponsored 25 highway-safety training courses under the Traffic Assistance Services for Kansas (TASK) program and co-sponsored two annual conferences – the Kansas

Transportation Engineering Conference and the Bridge Workshop.

In 2011, the K-State UTC will request an appropriation from the Research and Innovative Technology Administration (RITA) of the Federal Highway Administration (FHWA), U.S. Department of Transportation (USDOT), to continue and expand the center's research, technology transfer and education programs.

The requested congressional action could elevate the K-State UTC to the equivalent of a Tier I center, with annual federal funding of approximately \$1 million per year. This has the potential to greatly enhance the role of UTC to help discover and implement solutions to problems related to the safety and sustainability of the nation's rural transportation systems and infrastructure.

K-State UTC website: <http://transport.ksu.edu/>



MATC looks to improve highways

Longevity of the region's transportation infrastructure is a major concern due to diminishing highway revenues and increased usage. As a member of the Mid-America Transportation Center (MATC), CE's research and outreach efforts are directed toward lengthening the lives of the region's transportation infrastructure elements. MATC represents a consortium of six midwestern universities headquartered at the University of Nebraska, that is funded by a \$2 million per year grant from the U.S. Department of Transportation (USDOT) as part of the agency's regional University Transportation Center program. CE Professor Mustaque Hossain, who serves as an associate director of MATC, explained that research and

outreach projects sponsored by the center at KSU focus on the preservation and safety of the nation's regional rural transportation infrastructure.

KSU researchers are studying safety aspects of increased truck traffic on the region's rural highways due to increased freight movements and also evaluating the safety of motorcycle traffic on rural highways. Last year the center funded five research projects at K-State that supported four CE graduate students and provided summer internship supplements to nine CE undergraduate students placed at the Kansas Department of Transportation. MATC also co-sponsored the Kansas Transportation Engineering Conference and the Superpave Field Technician Certification Training program.

UTC Advisory Committee

Rodney Montney
KDOT

Paul Malir
TranSystems Corporation

J. Michael Bowen
Federal Highway Administration

W. Michael Lackey
KDOT (retired)

Mike Crow
Kansas Asphalt Pavement Association

E. Dean Carlson
Carlson Associates

Edward Mulcahy
TranSystems Corporation

Robert Thorn
Finney & Turnipseed (retired)

Leon Hobson
Riley County, Kan.

Greg Harkrader
Kansas Highway Patrol

Todd LaTorella
MO/KS American Concrete Pavement Association

Keith Browning
Douglas County, Kan.

Joan Roeseler
Federal Transit Administration

K-State to host regional competition, April 2011

Each year schools in the Midwest travel to compete in the steel bridge and concrete canoe regional competitions. These schools will be traveling to Manhattan, Kan., to compete in the 2011 Mid-Continent Regional Competition.

Regional chairs Rob Murphy (BSCE '10) and Rachel Spicer (Shawnee, Kan.) have been working hard with the student chapter of American Society of Civil Engineers at K-State to plan and run a successful competition. Several alumni will participate through financial contributions, by organizing events and participating as judges for various competitions.

Participating schools include Missouri University of Science and Technology, Oklahoma State University, Southern Illinois University - Carbonale, Southern Illinois University - Edwardsville, University of Arkansas,

University of Kansas, University of Missouri, University of Missouri - Kansas City, University of Nebraska - Lincoln, University of Nebraska - Omaha and University of Oklahoma.

The regional competition will be held April 28-30, 2011, on campus and at the Tuttle Creek River Pond Area. Main events include the steel bridge competition in Ahearn Fieldhouse on the 28th, concrete canoe presentations in the engineering atrium on the 29th, and the concrete canoe races at Tuttle Creek on the 30th. Other competitions being held across campus include geo-challenge, mystery event and technical paper competitions. All are open for public viewing. Luncheons and the banquet are reserved for registered participants.

For more details, please visit www.engg.ksu.edu/asce/ and click on the Regional Conference tab.

right: Andy Shearrer (Derby, Kan.) and Doug Duncan (BSCE '10) prepare their 'rocket' for flight in the mystery event competition of 2009.

below: Brett Blackwell (BSCE '10) loads sand into a five gallon bucket during the GeoChallenge competition in 2009.



Steel bridge team competes at nationals

The steel bridge team traveled to Norman, Okla., last April for the 2010 Mid-Continent Regional Competition. Four of the team's members participated in the geo-challenge, where they constructed a retaining wall for sand out of paper and tape. The geo-challenge team placed third, while the steel bridge team took home a first-place finish for the first time in recent history. The top two teams advanced to the National Student Steel

Bridge Competition at Purdue University.

Schools from across the nation and parts of Canada traveled to West Lafayette, Ind., to compete. K-State finished 23rd out of the 46 who competed. It was the team's sixth consecutive national appearance. Bridges were judged on aesthetics, deflection, weight, construction speed, economy and efficiency to determine an overall winner.

At the national competition, 2010 bridge

captains Trevor Fenton (BSCE '10) and Kurt Hershey (BSCE '10) announced their selection for the new captains. Matt Arnold (Shawnee, Kan.), John Handke (Topeka, Kan.) and Tyler Ummel (WaKeeney, Kan.) were chosen to lead the 2011 bridge team. While steel bridge traditionally only has two captains, it was decided that with regionals at K-State in 2011 it would be appropriate to select an additional captain.



Second Wamego service project completed

In fall of 2009, ASCE service project chair Tom Greer (Shawnee, Kan.) began working with the city of Wamego to set up a large service project for the ASCE Chapter. Greer teamed up with chapter president Chad Banka (BSCE '10), graduate student Steven Hammerschmidt (BSCE '08) and ASCE member Paul Galle to design a replacement for the railroad tie retaining wall and concrete stairs near the Kansas River.

The group looked into several different solutions, including using natural stone. 'Redi-Rock,' a gravity retaining wall made of precast concrete pieces, was chosen to be the best option because of its cost effectiveness and how simple it was to construct. The project began in the spring of 2010 and took two months of weekend work days to finally complete it by the beginning of summer.

City officials aided in the approval process, which Morris Crisler and the

parks department helped supervise. The project cost \$12,000 in materials, \$4,000 of which was donated by the company Midwest Concrete Materials. MCM supplied the Redi-Rock at a discounted price and waived the delivery fee. Several other places loaned equipment, keeping the overall cost to the city of Wamego down to \$8,000. K-State civil engineering department loaned shovels, wheelbarrows, levels, spray paint, chalkline, crowbars and safety equipment to the project. The city of Wamego, Wamego ACE Hardware, and ASCE practitioner advisor Dave Karnowski (BSCE '71) and colleagues donated equipment for the students to use, including a forklift with an extended boom, a skid loader, a front-end loader and a mini-backhoe.

Students worked with Karnowski and other professionals on surveying the land, tearing out the railroad ties and concrete steps, moving/preparing the soil and laying the Redi-Rock.

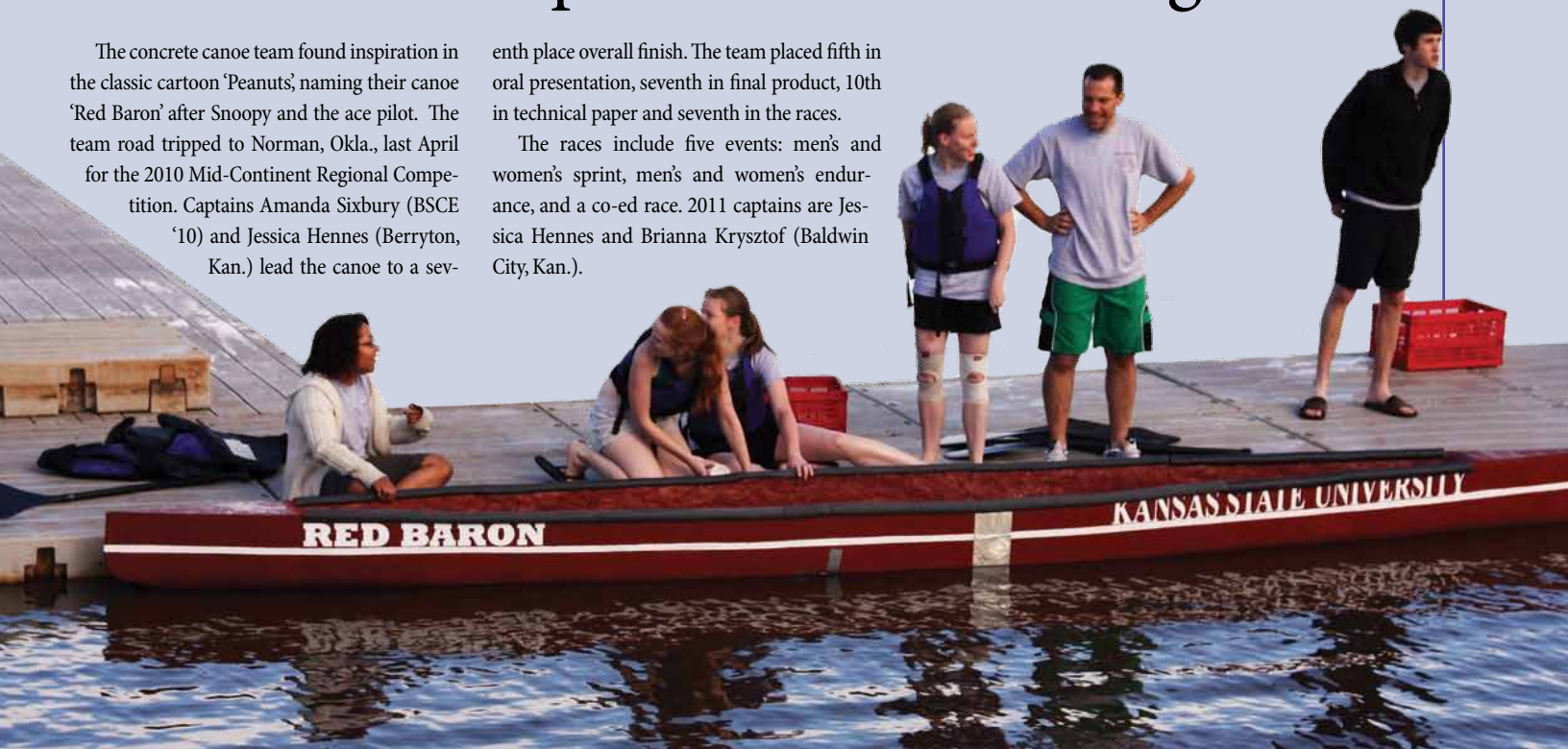


Concrete canoe places sixth at OU regional

The concrete canoe team found inspiration in the classic cartoon 'Peanuts,' naming their canoe 'Red Baron' after Snoopy and the ace pilot. The team road tripped to Norman, Okla., last April for the 2010 Mid-Continent Regional Competition. Captains Amanda Sixbury (BSCE '10) and Jessica Hennes (Berryton, Kan.) lead the canoe to a sev-

enth place overall finish. The team placed fifth in oral presentation, seventh in final product, 10th in technical paper and seventh in the races.

The races include five events: men's and women's sprint, men's and women's endurance, and a co-ed race. 2011 captains are Jessica Hennes and Brianna Krysztof (Baldwin City, Kan.).





Brandon Bortz (MSCE '10) conducts research at the Civil Infrastructure Systems Laboratory.

Geocell research at CISL

CE Professor Mustaque Hossain and graduate student Brandon Bortz (Preston, Kan.) have kept the wheels of the accelerated pavement testing machine at the Civil Infrastructure Systems Laboratory (CISL) going back and forth. They are researching geocellular confinement systems (geocells) made of a nano-composite polymeric alloy (polyester/polyamide nano fibers dispersed in a polyethylene matrix) for use in the base layer under asphalt pavements.

Geocells are 3-D, honeycomb-like confinement structures for granular materials. This confinement results in a stabilized base with higher stability that in turn reduces potholes and prevents other types of failure in asphalt pavements. Geocells have the potential to allow construction of road bases with longer lives and enhanced pavement sustainability. When geocells

are used, the quality of infill materials can be reduced. Thus waste materials from rock quarries or reclaimed asphalt pavement can be extensively used in geocell-reinforced bases.

The research project is funded by the Midwest States Accelerated Pavement Testing Pooled Funds program which is co-sponsored by the Departments of Transportation from Iowa, Kansas, Missouri and New York. PRS Mediterranean, Inc. of Israel has developed and manufactured the geocells used in the study. The project has employed and provided valuable research experience to the following CE undergraduate students: Luke McIntosh (Clay Center, Kan.), Robert Steffens (Andover, Kan.), Jessica Hennes (Topeka, Kan.) and Quinn Stenzel (Dodge City, Kan.).

New construction material to lower building costs

As part of an exciting new project on sustainable construction materials funded by the National Science Foundation, CE assistant professor Kyle Riding and his doctoral student Feraidon Ataie (MSCE '10) are developing natural supplementary cementitious materials for concrete to replace part of the Portland cement – the most energy intensive and expensive material in concrete.

Riding is applying pretreatment methods typically utilized by the biofuel manufacturing industry to modify ash produced from various agricultural residues, such as rice straw or wheat straw, into a material that will help strengthen concrete and make it more durable. This material is expected to find use in the construction of



Top left: wheat straw during pretreatment; **top center:** straw then placed into the oven to burn and create ash; **top right:** ash being removed from the oven; **bottom:** samples of different ashes; darker ashes contain more carbon, which will compromise ash quality

low-cost housing in developing countries where the cost of Portland cement is very high, relative to the country's gross domestic product. Portland cement in these countries is often imported, re-

sulting in chronic shortages.

Agricultural residue-based cementitious supplements provide the potential to overcome this obstacle by allowing the production of high quality, locally available

building materials. It is anticipated that as much as 50% Portland cement in concrete could be replaced by the organic cementitious supplement in low-cost building construction. Riding and Ataie will perform a detailed life-cycle analysis to quantify environmental benefits of the new material compared to that of Portland cement. Assistant Professor Wayne Yuan of biological and agricultural engineering is a collaborator.

World Bank helps re-engineer Kabul University

The \$3.5 million KSU-Kabul University Partnership project funded by World Bank ended successfully in 2010. The goal of the project was to reform the engineering education system at Kabul University (KU). The project established a research institute on the KU campus, installed more than \$5 million of equipment in KU laboratories and trained 12 engineering faculty from KU at K-State. CE Associate Professor Asad Esmaily played a lead role in helping transform KU's civil engineering program to a credit-based system, much like the one at K-State.

Esmaily developed two courses - Statics, and Design of Concrete Structures - and helped create KU's civil engineering curricula by specifying



KU faculty members visit K-State CE's Civil Infrastructure Systems Laboratory.

ing laboratory exercises and textbooks appropriate for local needs. In January 2010, Esmaily represented K-State CE in co-hosting a workshop to provide academic leadership training to

faculty members and department heads from KU. KU's dean of engineering and university chancellor also attended the workshop. Although the project has ended, Esmaily plans to

continue mentoring the two KU faculty members who graduated with M.S. degrees from K-State CE - Abdul Halim-Halim (MSCE '10) and Feraidon Farahmand Ataie (MSCE '10) - as well as three other KU faculty members whom Esmaily met in Kabul.

"Going back to KU with both of my degrees from KSU, I am confident that I can answer most of the questions of the students, who are thirsty for learning, properly and professionally, that I could not do otherwise. I hope I can contribute actively to the development and reconstruction of my destroyed country, Afghanistan," said Ataie, who is currently pursuing his Ph.D. at KSU under the guidance of CE Assistant Professor Kyle Riding.

Preventing failure of prestressed concrete railroad ties



CE researchers inspect concrete tie failure in track (inadequate bond is believed to be one of the primary causes).

Prestressed concrete railroad ties are becoming increasingly popular in the United States and are an essential component for higher speed railway lines. In order for these prestressed concrete ties to function adequately over their expected life, the prestressing force must be fully introduced into the railroad tie at a location well before the rail load is applied. The length required to transfer the prestress force into the concrete member is referred to as the "transfer length." When the transfer length is too long, premature in-track failure of the ties can occur.

CE Professor Robert Peterman, mechanical engineering graduate student Weixin Zhao, and collaborators Terry Beck of

mechanical and nuclear engineering and John Wu of industrial and manufacturing systems engineering are developing a rapid non-contact method to reliably determine transfer lengths at prestressed concrete tie manufacturing facilities on a regular basis. The method enables deficient ties to be quickly identified at the plant and prevented from being put into service, therefore reducing the need for costly in-track maintenance. Peterman and co-workers have successfully tested a prototype device at the CXT Concrete Tie Plant in Grand Island, Neb., and work has begun to develop a fully automated device that can be used to determine the transfer length in concrete railroad ties and other concrete members.

Strengthening soils with plant-derived biomass



Wilson Smith (BSCE'10), Paul Bartley (BSCE'10) and Associate Professor Dunja Perić display some of their findings in a soils lab.

Cellulose fibers and lignin are living composite materials from which plants derive the strength to sustain their own weight and wind-induced loads. Biofuel is produced from cellulose fibers, thus necessitating their prior separation from lignin. CE Associate Professor Dunja Perić and graduate students Wilson Smith (BSCE'10) and Paul Bartley (BSCE'10) are conducting research to find beneficial uses of the lignin generated during biofuel production. Ongoing investigations focus on evaluating the potential of lignin, a renewable material, to stabilize dry sands, such as those found in unpaved roads and sloping ground.

The inherent instability of sands at shallow depths is responsible for

frequent and costly maintenance of unpaved roads, which often serve as rural transportation lifelines. This potential beneficial use of lignin would directly contribute to the increased sustainability of transportation infrastructure, while lowering the price of biofuel.

Supported by scholarships from the University Transportation Center, Smith and Bartley are evaluating the material properties of compacted sand-lignin mixtures using compaction and direct shear tests. The goal of the research is to understand the underlying mechanism governing the increase in shear strength and particularly in cohesion of the sand stabilized by the plant derived bio-mass.



Reducing speeds using optical illusions

Fatal crashes are more frequent in rural areas, even though the number of vehicle miles traveled and the total number of crashes remain low. Meanwhile, speeding is a major concern in some of the small towns in rural areas, where highways pass right through, requiring considerable speed reductions. Limited resources in such areas make it important to identify low-cost and effective countermeasures to manage speeding.

CE Associate Professor Sunanda Dissanayake and graduate research assistant Abdoulaye Balde conducted a study to evaluate the effectiveness of optical speed bars in reducing speeds on approaches to small towns in Kansas. Test sites were identified and speed data was collected using automatic traffic data recorders at these sites before and after painting transverse "optical speed bars." Before- and after-speed data were statistically com-

pared for various vehicle types and based on time of day and day of week.

The analysis also considered opposite (unmarked) direction as the control. At four of the five test sites evaluated, statistically significant reductions in speeds and speed variation at the end of the optical speed bar treatment were noted, where the fifth site showed no change. Daytime speeds and speeds of two-axle vehicles showed highest reductions at

most test sites. However, speeds analyzed farther downstream of the treatments gave indication that speed reductions were not maintained for a long distance. When considering the low cost associated with this measure, optical speed bars might be a good way to control approach speeds in small communities. Kansas State University – University Transportation Center (KSU-UTC) provided funding for conducting this study.

CE a Wuertz family tradition

Augustine 'Gus' Wuertz (Richmond, Kan.) came to K-State following a tradition unlike any other student – he was to be the fourth of his eight other siblings to graduate from KSU with a civil engineering degree. He acquired a closet filled with three-ring binders of old notes from classes his brothers had taken. However, besides CE professors recognizing his similar appearance to his siblings, Gus said that following so many footsteps hasn't had any effect on his experience.

Gus' eldest brother Nick Wuertz (BSCE '00) worked several years for H&C designing bridges until the company was acquired by Burns & McDonnell. Nick now works as a structural engineer for Burns & McDonnell in Overland Park, Kan. He lives with his wife, Stephanie, daughter Hannah



Wuertz brothers from left to right: Joe Wuertz (former CE student), Nick Wuertz (BSCE '00), Gus (Augustine) Wuertz, Vinnie Wuertz, and George Wuertz (BSCE '01).

and is expecting a second child soon.

George Wuertz (BSCE '01) was a member of the KSU track team competing in the pole-vault competition. He now

lives in Ecuador where he is doing mission work for a local church, building a large community center that he helped design. George is also working on his master's degree from

KSU via distance education. He and his wife, Sheree, have two boys – Daniel and Nathan.

Joe Wuertz (former CE student) works for Aquaterra Environmental Solutions Inc. in Overland Park, Kan., as a field engineer. At K-State, Joe was very active in ASCE and concrete canoe. He now lives in Osawatomie, Kan., with his wife, Kimberly, and son Benjamin. Joe and Kimberly are planning to build a home back on their family farm near Richmond, Kan.

Gus says that he chose civil engineering initially because his family members graduated with CE degrees and he looked up to them. He had always been good in math and science throughout high school. As he went through the CE program, however, he realized that he really enjoyed civil engineering and saw it as an opportunity to serve the community.

KSU civil engineering fall banquet awards

ASCE Advisor of the Year:

Hayder Rasheed

ASCE Outstanding Faculty Award:

Kyle Riding

Chi Epsilon Student Advocate of the Year Award:

Kyle Riding

Chi Epsilon Undergraduate Teaching Excellence Award:

Bob Peterman

Outstanding Graduate Faculty Award:

Hayder Rasheed

APWA Scholarship Recipients:

Wes Nyberg
Laura White

Kansas County Highway Association Scholarships:

Wes Nyberg (Fall 2010)
Michael Armour (Spring 2011)

Outstanding Freshman Award:

Brianna Kryzstof

Outstanding Sophomore Award:

Walter Hicks

Outstanding Junior Award:

Tom Greer (Spring 2010)
Jessica Hennes (Fall 2010)

Outstanding Senior Award:

Wes Nyberg (Fall 2010)

Outstanding M.S. Award:

Abdul Halim

Outstanding Ph.D. Award:

Ahmed Abd El Fattah

College of Engineering Above and Beyond Awards:

Danita Deters
Peggy Selvidge
David Suhling
Debi Wahl

Outstanding Staff Award:

Peggy Selvidge

Outstanding Colleague Award:

Asad Esmaeily
Yacoub Najjar

Outstanding University and Professional Service Award:

Bobb Stokes

Outstanding Research Award:

Kyle Riding

Outstanding Teaching Award:

Asad Esmaeily

UTC Scholarships:

Graduate Students

Paul Bartley
Lisa Beck
Brandon Bortz
Doug Duncan
Abdul Halim
Steven Hammerschmidt
Rob Murphy
Shahin Nayyeriamiri
Paul Owings
Harrison Poole
Wilson Smith
Quinn Stenzel
Jeremiah Thomas

Undergraduate Students

Scott Fischer
Kory Rankin

UTC Student of the year:

Lisa Beck

2010-2011 undergraduate scholarship recipients

Matthew Arnold (Shawnee, Kan.) received the R.D. & Mary Andersen Scholarship and the Walter & Alice Bellairs Scholarship.

Samuel Corey (Overland Park, Kan.) received the Harold & Jane Neff Engineering Scholarship.

Aubrey Coulter (Park City, Kan.) received the E.C. Lindly Scholarship for Engineering Students and an Engineering Scholarship.

Brady Crites (Overland Park, Kan.) received an Engineering Scholarship.

Tyler Davison (Tulsa, Okla.) received the Harold and Jane Neff Engineering Scholarship.

Jordan Dettmer (BSCE '10) received the Kenneth & Maria Rector Scholarship.

Joshua Dlabal (Wilson, Kan.) received the Kenneth & Maria Rector Scholarship.

Adam Emerson (Tomball, Texas) received the Civil Engineering Excellence Scholarship, the Coen Family Civil Engineering Scholarship, the Everett & Marilyn Cupps

CE Scholarship and the S.H. Brockway Memorial Scholarship.

Luke Eschliman (Olathe, Kan.) received an Engineering Scholarship.

Thomas Greer (Shawnee, Kan.) received the J.E. Dunn Excellence Fund Scholarship through the College of Engineering.

Joe Harrington (Marquette, Kan.) received an Engineering Scholarship.

Brandon Heavener (Emporia, Kan.) received the Bruce E. Roberts Scholarship.

Samuel Hegarty (Arvada, Kan.) received the Edwin & Eunice Wambsganss Engineering Scholarship.

Jessica Hennes (Berryton, Kan.) received the Edwin & Eunice Wambsganss Engineering Scholarship.

Walter Hicks (Wichita, Kan.) received the Stephan Konz Scholarship, the Robert Callen King Award in Civil Engineering and an Engineering Scholarship.

Caleb Jurey (Oakley, Kan.) received an Engineering Scholarship.

Trevor Kaufman (Newton, Kan.) received the Charles Freund Memorial Scholarship, the Wildcat Construction Co., Inc. Scholarship and the William & Mila Kimel Engineering Scholarship.

Katie Krol (Overland Park, Kan.) received the Alfred Johnson Memorial Scholarship, the Edmond E. Young Scholarship and the Lonsinger Scholarship.

Brianna Krysztow (Baldwin City, Kan.) received the Ben Sellers Scholarship in Civil Engineering, the Bruce E. Roberts Scholarship, the Kevin & Polly Schoen Engineering Scholarship, the Vicki Scharnhorst Civil Engineering Scholarship and an Engineering Scholarship.

Jared Loomis (Macksville, Kan.) received the Orville & Doris Spray Family CE Scholarship.

Casey Mahoney (Bonner Springs, Kan.) received an Engineering Scholarship.

Sara Mann (Hutchinson, Kan.) received the Orville & Doris Spray Family CE Scholarship.

Luke McIntosh (Oak Hill, Kan.) received the Alan & Sharon Sylvester CE Scholarship and an Engineering Scholarship.

Daniel Mealiff (Beloit, Kan.) received the Francis Wagner Memorial Scholarship and the Edward Wilson Civil Engineering Scholarship.

Wesley Nyberg (BSCE '10) received the Albert Lin Scholarship in Civil Engineering and an Engineering Scholarship.

Ariel Philbrick (Wichita, Kan.) received the Jeanne & Edward Mulcahy Scholarship, the Karl J. Svaty Memorial Engineering Scholarship and an Engineering Scholarship.

Kory Rankin (Olathe, Kan.) received an Engineering Scholarship.

Robert Reilly (Overland Park, Kan.) received the Clair Mauch Memorial Scholarship in CE and an Engineering Scholarship.

Joseph Shaw (Eureka, Kan.) received the Civil Engineering Excellence Scholarship, the Phebe Bissell Memorial Scholarship and the Tonton Family Scholarship.

Distance education master's courses

The civil engineering department offers graduate-level courses leading to a master of science degree in civil engineering to off-campus students—no matter where they live. All courses needed for the degree will

be offered online or by other multimedia delivery methods. Students only need to travel to K-State once, at the end of their program, for an oral examination conducted by their graduate committee. A master's degree can

also be counted as a year of credit toward earning a professional engineering license. For information on earning this license, go to the Kansas Board of Technical Professions online at <http://www.kansas.gov/ksbtp/>.

Summer 2011

- CE 703 Responsibility in Engg.
- CE 704 Responsibility in Engg. 2:
Leadership & Diversity
- CE 790 Prb/Engg. Ethics: Case Studies

Fall 2011

- CE 654 Design of Groundwater Flow Systems
- CE 704 Responsibility in Engg. 2:
Leadership & Diversity
- CE 728 Adv. Geotechnical Design
- CE 732 Adv. Structural Analysis I
- CE 745 Structural Dynamics
- CE 751 Hydraulics of Open Channels
- CE 786 Land Development for Civil Engr. & Planners
- CE 802 Adv. Mech Materials
- CE 861 Environ. Engg. Chemistry
- CE 874 Sustainable Transp. Asset Mgmt.
- CE 898 Master's Report

Division of Continuing Education:

131 College Court Building
Manhattan, KS 66506-6001

Email: info@dce.ksu.edu

Phone: 1.877.528.6105

Visit online:

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Department of Civil Engineering
2118 Fiedler Hall
Manhattan, KS 66506-5000
785.532.5862

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