



Civil Matters

Kansas State University Department of Civil Engineering

April 2012, Volume 10, Issue 1



Student's
EWB trip **04**



Alumni
profiles **06**



Regional
conference **09**



High-speed
rail **10**

Table of contents

03 Peggy Selvidge retires after 40 years of service

09 Mid-Continent Regional ASCE Conference

12 Urban Water Institute at the Olathe campus

13 Department adds new faculty and staff

From the department head

For more than 100 years, K-State civil engineering has produced some of the most successful engineers, public workers, entrepreneurs and leaders in the state of Kansas and the nation. Our students have performed excellently in national examinations such as the FE, have received national awards and scholarships, and have competed with the best in the country at concrete canoe and steel bridge competitions. Members of our faculty have been recognized by the college and university for their outstanding teaching and advising, by ASCE and other professional societies for their contributions to the profession, and by industry and research agencies through awards of research and testing grants. It has indeed been a great pleasure to serve another year as the head of this outstanding department and to represent K-State civil engineering alumni, students, faculty and staff on campus, in Kansas and across the country.

In this edition of Civil Matters, we present a glimpse of our activities and accomplishments over the last year. You will read about Rachel Spicer, senior from Shawnee, Kan., who was honored by ASCE with a national award for student



leadership; about a successful ASCE regional student conference held in Manhattan; about the steel bridge team bringing in a number one regional ranking once again; about Scott Wetzel (BSCE '93) who received a Professional Progress Award from the College of Engineering; about Natalie Mladenov, our newest

faculty member in the environmental engineering area; about professors Mustaque Hossain, Yacoub Najjar and Bob Peterman who were honored with endowed professorships; about last year's scholarship and award recipients; and about the cutting-edge research and discovery happening in our laboratories.

I share your pride in K-State civil engineering. If you happen to be in Manhattan or in northeast Kansas, please drop by. Our faculty, staff and students will be happy to spend time with you and show you around!

Have a great year and go Cats!

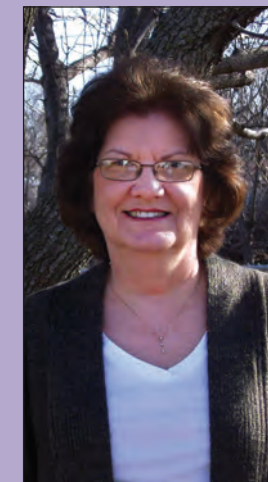
Alok Bhandari

Alok Bhandari, Ph.D., P.E., FASCE
Department Head and
Dr. Robert Snell CE Alumni Professor

Peggy Selvidge 2011 retirement

Peggy Selvidge retired from her position as administrative officer in fall 2011. She was hired by department head Prof. Jack Blackburn ('63-'72) in 1971. She notes, "I feel privileged to have worked for some awesome department heads during my CE career." Selvidge assisted various K-State CE heads and interim heads over 40 years including Prof. Bob Snell ('72-'92), Prof. Stu Swartz ('92-'00), Prof. Lakshmi Reddi ('00-'07), Prof. Jim Koelliker ('07-'08), Prof. Yacoub Najjar ('08-'10), and Prof. Alok Bhandari (since '10).

The CE faculty and staff have always been like Selvidge's extended family. She enjoyed meeting new students and working with student organizations. She also enjoyed meeting alumni and advisory council members during open house and at banquets, picnics and events. Since her retirement, Selvidge has been doing things at home, spending time



with family and traveling. She has been to Arizona and San Francisco, and is looking forward to an Alaskan cruise in September.

"The CE department was a very rewarding place for me to work. I want to thank everyone for the kindness extended to me, and for their friendship. I would love to hear from former students," says Selvidge. Selvidge can be reached at pselvidg@gmail.com.

Recognizing excellence

When Rachel Spicer, Shawnee, Kan., was younger she frequently went on sailing cruises in the Great Lakes with her grandma. The trips sparked an enduring interest in bridges, dams and other large structures. Spicer, CE senior, turned that interest into a passion and now has been recognized for her efforts.

Spicer received the American Society of Civil Engineers' prestigious Student Leadership Award. The nomination-based award is given in recognition of leadership in a student chapter or international student



group through various activities, including services as an officer, leading special events and interaction with university administration. Spicer has served in a multitude of roles with the K-State ASCE chapter including vice president, 2011-2012

steel bridge team captain and co-chair of the 2011 Mid-Continent Student Conference.

In addition to her involvement with ASCE, Spicer has served in a variety of roles with the K-State Collegian, including copy and presentation editor, and editor-in-chief.

Professional progress



Scott Wetzel (BSCE'93, MSCE'95) received the 2011 Professional Progress Award from the College of Engineering. He began his consulting career with Bucher, Willis & Ratliff Corporation in Salina, Kan., as a project engineer. In 1998 Wetzel was promoted to project manager and in 2003 to team leader.

Currently, he is Vice President and Principal with H.W. Lochner, Inc., a Chicago-based consulting engineering firm. He serves as manager of Lochner's Austin, Texas, office.

On the Cover

04: Senior **Lauren Winnen** traveled to Guatemala with the K-State Chapter of Engineers Without Borders.

06: See who the beloved Disney character Pluto is posing with on the alumni profiles page.

09: K-State hosted the 2011 Mid-Continent Regional Competition, including steel bridge, concrete canoe and more.

10: **Dr. Robert Peterman** is researching transfer lengths in concrete railroad ties to help improve their strength for high-speed rail.



Concrete canoe pour day



ASCE Assembly

Endowed scholarships

Scholarships are the lifeblood of educational dreams. Today's students are our future leaders. By establishing an endowed scholarship, you create opportunities for students who may not be able to afford their education or reward them for their academic efforts. Endowing a scholarship may also provide recognition to your family, faculty or distinguished colleague.

When companies and/or industry associations endow a scholarship, they help attract the best and the brightest students to pursue a career in their respective industries or professional fields of endeavor.

We appreciate your consideration. Please visit our website at www.ce.ksu.edu or contact Lori Rogge, Sr. Director of Development, College of Engineering, at 785-532-7539 or email at lorir@found.ksu.edu for more information.

Student travels to Guatemala

Lauren Winnen, Lakewood, Colo., CE senior travelled to Panajachel, Guatemala, during spring break 2010 with K-State's Engineers Without Borders student organization. The trip was co-sponsored by Heart to Heart International of Olathe, Kan., as part of its community health initiative.

Winnen was part of a seven-member K-State team that checked domestic water filters, volunteered at a local clinic and provided school kids with de-worming medicine.

She summarized her experiences in Guatemala saying, "The lifelong memories and lessons that I took from our short time in Guatemala are numerous. I have a much greater desire to conserve the resources that we in the United



States perceive as being so readily available to us and to use my engineering education to help others do the same. I will never forget the beauty of the area that we were in, from the lake surrounded by

mountains and volcanoes to the colorful traditional clothing that the women wore." Winnen is the second CE student to have participated in an EWB international service-learning trip.

Open house award



The K-State Student ASCE Chapter focused on the 2011 Mid-Continent Regional and improving open house participation. The theme for the 2011 open house was "Pushing the Limits" and the civil engineering department did just that. Festivities began with a parade Friday morning consisting of a float and skit from each department. The civil engineering department wowed the crowd and received a roaring applause with their well-choreographed dance and mural. The students (pictured above) were awarded second place in the competition for their efforts.

Students worked outside of

class to put together displays with topics such as pervious concrete, surveying, the Hoover Dam and a model of how the Deep Water Horizon oil spill was plugged. Future students were able to get a feel of what civil engineering is all about through the interactive displays as well as hands-on activities in the environmental lab. Children learned about the transportation side of civil engineering by racing remote-control cars through a model of K-State's campus. All the hard work that the many student volunteers put into open house this past year made it a fun and successful weekend.

XE begins mentoring freshmen

Chi Epsilon has been quite busy with recent induction of new members and planning a service project. In fall 2011, the chapter inducted seven new members: Tyler Davison, Mulvane, Kan.; Brady Crites, Overland Park, Kan.; Dominic LaRocca, Kansas City, Mo.; Colin O'Leary, Norman, Okla.; Sara Mann, Hutchinson, Kan.; Josh Riley, Lees Summit, Mo.; and Tanner Yost, Minneola, Kan. Along with the new initiates, the K-State chapter selected Cathy Ritter (BSCE '75), President of Constellation Design Group, Inc., as the chapter honor member.

For the biannual service project, XE officers and initiates teamed up with the U.S. Army Corps of Engineers and went to several playgrounds around Tuttle Creek Lake laying down fresh mulch. This spring Chi Epsilon plans to team up with the Corps of Engineers again and help with cleaning up more playgrounds in Tuttle Creek State Park.

CE Associate Professor Steven Starrett and department head Alok Bhandari helped start a freshman mentoring program through the CE 101 class. Ten chapter members helped two to three groups of students with their projects, enrollment and civil engineering-related questions. The CE department allocated \$1140 toward the mentoring program.

This allocation greatly helped the chapter with sending a chapter delegate to attend the 42nd National Conclave, hosted by Pacific District Chi Epsilon Chapters in Los Angeles, Calif. Tom Greer, Shawnee, Kan., represented the chapter in the Conclave and brought back new ideas to campus.



Left to right: 2011 CE advisory council members: **Catherine Patrick** (KDOT); **James Tadtman** (Wildcat Construction Co., Inc.); **Darold Davis** (Garver, LLC); **Larry Emig** (KDOT, retired); vice president, **Gregory Weatherd** (HNTB Corporation); secretary **Dianne Honomichl**; president, **Keith Warta** (Bartlett & West, Inc.); **Karla Waters** (Wilson & Co., Inc.); **John Ahern** (EvapTech, Inc.); **Cathy Ritter** (Constellation Design Group, Inc.); and **Greg Allison** (MKEC Engineering Consultations, Inc.) Not pictured: **Bob Thorn** (Finney & Turnipseed LLP, retired).

70s Cathy Ritter

With the help of her mentor, Dr. Ewell Bomhardt, Cathy Ritter (BSCE '75) was able to open her own engineering firm, Constellation Design. Originally from Overland Park, Kan., Ritter now resides in Maryland where her firm is located.

Ritter and her husband, also a civil engineer, have two sons. She enjoys agility training with her border collie/flatcoat retriever mix.



Letter from the advisory chair

What a great time to be associated with the civil engineering department at K-State. Current enrollment is at an all-time high, a new engineering funding initiative has been created by the state of Kansas, and the department staff and faculty are dedicated to making a difference in the lives of civil engineering students.

The Civil Engineering Advisory Council provides a link with the practicing profession and is dedicated to assisting the department in providing the highest quality of education. We provide input on curriculum, assist with faculty recruitment, engage in student activities, assist with ABET accreditation, and help develop research and technology transfer. Our council consists of 12 practicing engineers who are committed to the advancement of engineering at K-State. A large part of our activities involve direct support for Dr. Alok



Bhandari, who is an ex-officio member of the council.

A few of the issues on which we are focused this year include ABET accreditation, funding for the department and curriculum review.

Over the past few years, the council has spearheaded a survey of employers to solicit information for the ABET assessment process and also met with ABET evaluators during their recent on-campus visit. This process has confirmed the quality of our civil engineering program.

Understanding that adequate

funding is necessary to attract and maintain top-level students, faculty and facilities, the advisory council is actively involved with identifying funding sources and educating alumni on needs in the department.

A key function of the council is to review the curriculum and compare current courses with industry needs to ensure the current focus matches identified requirements. Comments from this review are being integrated into the curriculum modification that is underway.

The Civil Engineering Advisory Council is focused on supporting improvement of our civil engineering department and is passionately involved in advancing engineering at K-State. Go Cats!

Keith A. Warta

Keith Warta (BSCE '84)

Blast from the past—through the decades

00s Russell Yarnell

After graduating in the general option of civil engineering, Russell Yarnell (BSCE '04) decided to pursue his master's in biological and agricultural engineering. Immediately Yarnell knew he wanted to get his P.E. and focus on water and wastewater projects.

Seven months before completing his M.S., Yarnell tied the knot with his wife, Christi. They have two sons, Orrie, 4, and Davis, 1. When he is not spending time with his family,

Yarnell enjoys running to help relieve stress. He also tries to participate in KSPE and ASCE.

One of his favorite projects was an ARRA-funded water treatment plant for the city of Russell, Kan. This project was rushed due to government deadlines. Yarnell is currently an engineer for Bartlett and West in Topeka, Kan.

"No project is ever perfect," he said, "but make sure you learn from mistakes for future reference."



90s Scott Wetzel

Even as an undergraduate student, Scott Wetzel (BSCE '93) knew he wanted to design water and wastewater systems. In his first year as a consultant, Wetzel was helping create a computer model for a large water distribution system. In order to check the accuracy of the model, field tests had to be conducted at various hydrants within the system. Wetzel was assigned to test a hydrant served from a 36-inch water main.

When fully opened, the hydrant released water with a static pressure of over 90 psi,

shooting water out 50-60 feet, much to his surprise.

Born and raised in Tribune, Kan., Wetzel now lives with his wife, Jerie, and two dogs, Sadie and Abbie, in Texas where he opened a new LOCHNER office about five years ago.

Outside the office he enjoys attending sporting events, hunting, metal sculpting, woodworking and spending time with his wife.



UTC creates student sponsorship opportunities

Hosted by K-State civil engineering, the University Transportation Center (UTC) is a multidisciplinary 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. The center is directed by CE Professor Robert W. 'Bobb' Stokes.

Since its establishment in FY 2006, the UTC has secured and distributed more than \$2,300,000

in research funding that has supported 30 research projects beyond those funded by the Kansas Department of Transportation's (KDOT) Kansas Transportation Research and New Developments (K-TRAN) program. The Center has awarded 36 UTC scholarships, 27 GRA positions and funding support for the completion of five M.S. theses.

The center has awarded 50 student travel grants to attend national transportation conferences, provided funding support for the KDOT Summer Internship Program and played a key role in

establishing a distance education-based graduate certificate program in transportation engineering.

K-State UTC sponsors the annual Kansas Transportation Engineering Conference, the annual Bridge Workshop, and 30 highway safety training courses through the Traffic Assistance Services for Kansas (TASK) program co-sponsored by the University of Kansas, the Federal Highway Administration and KDOT.

Complete details on the University Transportation Center's programs are available on the web at <http://transport.ksu.edu/>

UTC Advisory Committee members

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.); and **Joan Roeseler** (Federal Transit Administration).



MATC works to preserve infrastructure

The Mid-America Transportation Center was designated as the Region VII United States Department of Transportation (USDOT) University Transportation Center (UTC) in a competitive process in 2006. Region VII includes Iowa, Kansas, Missouri and Nebraska. The 2006 MATC was a consortium of seven universities within the region with the University of Nebraska-Lincoln (UNL) as the lead institution. CE Professor Mustaque Hossain has served as an associate director of MATC representing Kansas State University.

In recent years, K-State has had remarkable success in augmenting its transportation research, education and technology transfer program through MATC, which has

supported research of CE faculty members working on the preservation and safety of our regional transportation infrastructure. K-State's efforts are directed toward prolonging the life span of transportation infrastructure elements, safety aspects of increased truck traffic on our highways due to increased freight movements and effects of motor cycles in the mix. K-State has also participated in a national pooled-funds project to investigate accommodating oversized/overweight trucks at roundabouts. MATC projects have supported seven graduate students and provided tuition fees and travel assistance to several other graduate students.

MATC was successful in the 2011

re-competition for regional UTCs as part of USDOT's \$77 million UTC program. The reauthorized MATC will have two new partners: Iowa State University and University of Missouri-Columbia, along

with the University of Nebraska-Lincoln, University of Kansas, University of Iowa, Missouri University of Science & Technology, Lincoln University and Prairie View A&M University. The center is funded at \$3.5 million per year and will focus its activities on the following USDOT strategic goals: enhancing safety, state of good repair, economic competitiveness and environmental sustainability.



Gleen Fager, P.E., (BSCE '69) recently retired district material engineer of KDOT, teaches at a Superpave Certificate Program of MATC at KSU. About 40 engineers and technicians attend this course every year.

80s Karla Waters

Many people claim to "bleed purple" but for Karla Waters (BSCE '88) this is a loved lifestyle. Waters enjoys embarrassing her husband, Jeff, and two daughters, Brooke and Bailey, at K-State football and basketball games.

Originally from a farm southwest of Concordia, Kan., Waters is now a project manager at Wilson & Company, Inc. One of her favorite projects was an expansion of the two-lane K-61 in Reno County, Kan., which

presented many challenges including alignment, drainage issues due to the soil in the sand hills, and addressing property owners concerns.

When not working, Waters enjoys cooking, reading, being involved in church activities and attending her daughters school functions, including softball games.

Waters challenges herself to never stop learning and hopes to help persuade younger students to pursue a career in civil engineering.



Seventh consecutive national for steel bridge

The 2011 K-State steel bridge team, led by Matthew Arnold, Shawnee, Kan., and John Handke, Topeka, Kan., swept the regional competition placing 1st in lightness at 364 pounds; economy at \$3,638,750; efficiency at \$1,766,089; and overall at a total cost of \$5,404,839. The team took 2nd in deflection with 0.405 inches, and construction speed with 23.86 minutes and 3rd in aesthetics. The strong finish led the team to Texas A&M University in College Station, Texas, for the National Student Steel Bridge Competition May 21 and 22.

The same rules and scoring are used at each competition. Bridges are judged on their aesthetics, lightness, construction speed, aggregate deflection, construction economy and structural efficiency. Economy is based off of both the build time as well as the number of builders and temporary piers the team utilizes



"Steel Willie VII" setup in Ahearn before the aesthetics judging. Tyler Ummel (BSCE '11), along with other team members, wait for competition to begin while the 11 other participating schools set their bridges up.

during construction. Efficiency is based on the weight of the bridge and the aggregate deflection. The overall score or cost of the bridge is the economy plus the efficiency.

At nationals, the build team

dropped 5.48 minutes off of its construction time, cutting \$822,500 dollars off the economy of the bridge. Modifications to the bridge between the competitions decreased the aggregate deflection by 0.105 inches,

causing the team to miss a 3rd-place finish by only eight thousandths of an inch. This decrease in deflection also decreased the efficiency by \$40,829. Unfortunately the team accrued a 300lb weight penalty because the bridge was built crooked on the foundation easements. "Steel Willie VII" finished 25th in the nation out of the 48 schools invited.

Rachel Spicer, Shawnee, Kan., hopes to lead the 2012 team to an eighth consecutive national appearance on Memorial Day weekend in Clemson, S.C. The regional competition will be held in Lincoln, Neb., April 19-21.

The 2012 team began fabrication in January, starting off with two workdays a week to try to complete the bridge before spring break. The bridge design is also an under truss with a cantilever. Due to rule changes, the cantilever is a foot longer, introducing many design challenges.



K-State's concrete canoe 'Catalyst' sits against the beach at Tuttle Creek River Pond below the dam on April 23, 2011. K-State held its first concrete canoe competition in this area in 1974.

2011 Mid-Continent Regional hosted at K-State a success

Every seven years K-State hosts the Mid-Continent Regional Conference which consists of steel bridge and concrete canoe competitions, geotechnical challenge, technical paper presentations, and a mystery event.

In the geotechnical challenge, students design and fabricate a paper retaining wall. Teams were given tape, scissors, poster board and drawing paper for wall fabrication and had to bring a dimensioned wood box with one removable side. Friction was the only thing holding

the wall in place. It wasn't permitted to be taped to the box. This wall must retain approximately 70 pounds of sand for 30 seconds before loading actually begins. The walls were then loaded with up to an additional 75 pounds. Schools were scored by who held the most weight, used the least amount of material and fabricated their wall the quickest. K-State took 3rd place out of the three participating universities.

The technical paper presentation topic was "Ethics and the Report Card for America's Infrastructure".

Students turned in a paper to be scored before the conference and presented during competition days. The overall score was equally weighted between the paper and presentation. Rachel Spicer took 3rd place for K-State out of 12 participating schools.

Following the conclusion of presentations was the mystery event. There were two parts to the mystery event. One was to construct a boat that would travel the furthest in the canoe swamp tank and the second part was the boat had to hold the

most weight before submerging. Students were given balloons, plastic cups, scissors, tape, pop sickle sticks, rubber bands and straws to use for construction. There was a large variation in the basic design concepts and everyone thoroughly enjoyed the competition.

There were a total of 12 participating universities in the conference. Overall, the universities were very pleased with the conference, the only complaint being the frigid temperatures and strong wind during the concrete canoe races.

Steel Bridge Judges



Concrete canoe finishes second at regionals



Top: Jenny Swabb, Basehor, Kan., Sara Mann, Hutchinson, Kan., and Cassandra Stalbaumer, Gower, Mo., row during the women's endurance race on April 23, 2011. **Above:** Design team members help canoe co-captain Brianna Krystof, Baldwin City, Kan., lower "Catalyst" into the swamp tank in the engineering plaza on April 22, 2011.

For the first time since 2008, the concrete canoe team placed in the top three at the regional competition. "Catalyst" took 2nd overall out of 12 participating teams, taking 1st place in the oral presentation, 7th place in final product, 7th place in the races, and 10th place in the technical paper. The theme "Catalyst" was chosen by co-captains Jessica Hennes, Berryton, Kan., and Brianna Krystof, Baldwin City, Kan.

This theme was sparked from the definition of catalyst, something that starts a chemical reaction. The captains hoped to bring new life to the team with "Catalyst" after several years of modest finishes.

The team was judged on four categories: design paper, oral presentations, final product and five races. Each of these are worth 25 of the 100 total points. Teams are also required to submit an engineers'

notebook at competition that is a technical document containing supportive information related to the design and construction on the canoe. This may include certificate of compliance, photos of construction stages, hull thickness/reinforcement calculations, percent open-area calculations and technical data sheets of the products used in the canoe.

The 2012 rules allowed teams to design their own hulls or use the same hull design that had been provided previously. Co-captains Brianna Krystof and Jenny Swabb, Basehor, Kan., decided to design a hull to try to help with the canoe's maneuverability. With this the team poured two canoes, a practice one and one for competition. The 2012 theme is Amelia Earhart. The display will have wings and the canoe will make up the body of the plane.



Left: Dustin Hoyt, Lawrence, Kan., and Josh Sommerfeld, Shawnee, Kan., prepare to test K-State's mystery event boat for the distance part of the competition in the concrete canoe swamp tank. **Below:** Robert Schweiger, Shawnee, Kan., and Andy Shearer, Derby, Kan., construct K-State's bridge in Ahearn Fieldhouse during the steel bridge competition. **Right:** Luke McIntosh (BSCE '11), Brandon Bortz (BSCE '08, MSCE '10) and Josh Sommerfeld, Shawnee, Kan., try to load K-State's geotechnical wall to failure. The wall held around 400 pounds without failing.



Faculty rewarded with professorships

Endowed gifts such as professorships help attract and retain faculty members of the highest caliber at K-State CE. Contributions made by

CE alumni and friends help fund endowed professorships. Three CE professors were appointed to endowed positions in 2011.

Mustaque Hossain



CE Professor Mustaque Hossain was appointed as the inaugural Munger Professor of Civil Engineering. The Munger professorship was established by Elmer and Vivian Munger to recognize Harold H. Munger (BSCE '39), Elmer L. Munger (BSCE '36) and Harold H. Munger (BSCE '70), and to provide financial support for a distinguished faculty member in the department of civil engineering.

Yacoub Najjar



CE Professor Yacoub Najjar was appointed as the inaugural Thomas and Connie Paulson Civil Engineering Outstanding Faculty Awardee. The Paulson faculty award was recently established by Tom (BSCE '73) and Connie Paulson to inspire the highest quality faculty in the College of Engineering at KSU.

Robert Peterman

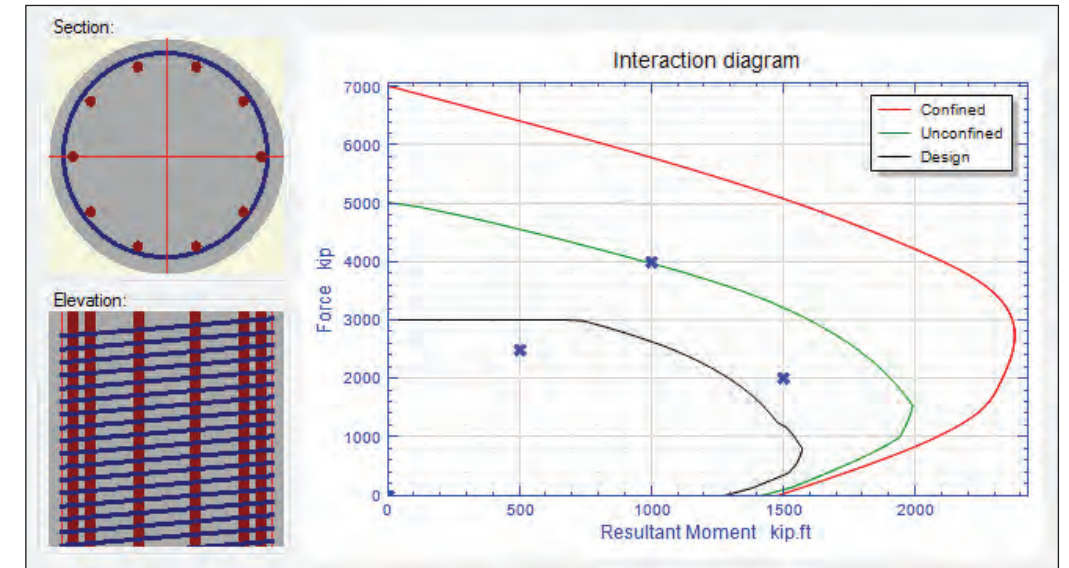


CE Professor Robert Peterman was appointed as the Martin K. Eby Distinguished Professor of Engineering. The Eby professorship was established by Martin K. Eby (BSCE '56) and Charles K. Eby (BSCE '67) in 1995 to help attract and retain a faculty member of superior qualifications in the department of civil engineering or the department of architectural engineering and construction science.

Software helps strengthen bridge piers

CE Associate Professor Hayder Rasheed, and his graduate student Ahmed Abd El Fattah have updated the K-DOT Column Expert software by extending the nonlinear moment of the area concept to analyze the generalized case of biaxial bending plus axial compression in concrete columns. The development of this software has been funded by the Kansas Department of Transportation.

In addition to standard analysis and design, the software can assess the actual ultimate capacity of bridge piers when subjected to extreme loading events such as truck impacts. The extra strength of the bridge piers comes from confining the concrete columns with closely spaced spiral or hoop reinforcement as well as repairing the piers by wrapping them with fiber-reinforced polymer.



The output of the software is benchmarked against a wide spectrum of experimental data confirming the accuracy of its

predictions. Rasheed's research related to this project was recently published in the Journal of the Franklin Institute: Engineering

and Applied Mathematics, Computers and Concrete and in Applied Mechanics Reviews.

Improved high-speed-rail concrete ties

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 service 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.

Since the prestressed concrete ties are relatively short and have extremely large impact loads applied near the member ends, most of the prestressed concrete railroad tie producers utilize indented prestressing wires or strands. It is generally understood that these indentations serve to improve the bond between the steel and the concrete and therefore reduce the transfer length.

However, because the application of these indented reinforcing



steels has been so limited, current design codes in the United States do not yet address the transfer length of indented prestressing steels.

CE Professor Robert Peterman is leading a two and one-half year, \$1.35 million research project funded by the Federal Rail Administration. Project collabora-

tors include Prof. Terry Beck, mechanical and nuclear engineering, and Prof. John Wu, industrial and manufacturing systems engineering. Results of the project will generate a quantitative understanding of the interaction between the concrete mixes and prestressing steel reinforcements used in the fabrication of prestressed concrete

cross-ties. This knowledge is essential for proper design of concrete cross-ties used in higher speed railway applications in order that they perform well during their entire service life.

The K-State researchers will be conducting this work in Manhattan, Kan., as well as at the CXT Concrete Tie Plant in Tucson, Ariz.

Factors for high severity of truck crashes



Do you know that truck crashes are more severe than other types of crashes? Each year about 4,000 people die in motor vehicle crashes associated with large trucks and about 75% of those fatalities are among the other-vehicle occupants. KSU civil engineering department is conducting a study to identify factors related to high severity of truck crashes on our roadways. Funded by the Mid-America Transportation Center, Dr. Sunanda Dissanayake and graduate student Siddhartha Kotikalapudi are analyzing the large-truck crash data from

Kansas to understand the issue in detail. Based on preliminary analysis, a majority of contributory causes (73%) related to truck crashes involve the driver. Among those, failing to give time and attention, speeding and failing to yield right of way were the top three driver-contributory causes. Statistical modeling of truck crashes identified the factors that lead to increased severity of truck crashes, where it was seen that factors such as driving under the influence of alcohol contribute not only to the occurrence of crashes, but also increase the severity.

Arsenic contamination of groundwater



Dr. Mladenov collects sediment core to investigate how arsenic is mobilized from sediments into the groundwater underlying the Okavango Delta of Botswana.

CE Assistant Professor Natalie Mladenov is studying the connections between human development, global change and water quality of rivers, lakes and groundwater. Her current research explores how arsenic contamination of groundwater affects the exposure of more than 100 million people in southeast Asia to this poisonous element.

Arsenic occurs naturally in the soils of the region and its mobilization is intimately linked to the presence of dissolved organic matter in the groundwater. Much still remains to be learned about the sources of organic matter in arsenic-laden groundwater and the relationships between arsenic and organic matter. Mladenov is using novel techniques to characterize

organic compounds and determine their sources. Results from her collaboration with scientists from the U.S. and Bangladesh appear to point to sewage pollution of soils and natural organic matter in the soil as factors affecting the mobilization of arsenic in groundwater.

Mladenov's other research projects related to arsenic explore the formation of carcinogenic byproducts during the disinfection of low-arsenic, pathogen-contaminated groundwater and the extent of natural arsenic pollution in arid, sub-Saharan Africa. A better understanding of arsenic mobilization can help multitudes of people affected by this crisis treat water or look for new, sustainable sources of drinking water.

New institute to focus on urban water

Water has been identified as one of the most critical resources for the future. In 2011, KSU President Kirk Schulz announced the establishment of the K-State Urban Water Institute (UWI) at the university's Olathe campus. CE Professor

and head, Alok Bhandari, will serve as the founding director of the institute. UWI will be developed as a premier center of knowledge and outreach focused on sustainable water management in urban and urbanizing environments. The institute will advance and promote public policy,

water management approaches and innovative treatment technologies that support sustainable use of water.

The Urban Water Institute is strategically located on the K-State Olathe campus in the Kansas City metropolitan area, home to a variety of world-renowned agen-

cies, businesses and organizations that focus on water. UWI will bring together industry, researchers, policy makers, advocates and educators to identify and develop solutions for complex, cross-disciplinary and cross-boundary concerns related to urban water sustainability. By being located at Olathe, the institute will help connect the water industry in the Kansas City region with more than 50 water experts on KSU's Manhattan campus.



Additions to the civil engineering department

Natalie Mladenov

Natalie Mladenov joined the CE faculty in January 2012. She was born and raised in the Big Apple, New York City. Mladenov attended the University of South Florida, where she received her B.S. in civil engineering, and the University of Colorado at Boulder, where she completed her M.S. and Ph.D. in civil, environmental, and architectural engineering. Throughout her graduate career, she worked in consulting as a water resources engineer. After graduate school, she was a postdoctoral research associate at the University of Virginia and the Univer-

sity of Granada, Spain and then went on to serve as a research scientist and the associate director of the hydrological sciences graduate program at the University of Colorado at Boulder.

Mladenov's research is in environmental engineering and focuses on advancing the understanding of how natural organic matter (NOM) influences water quality in pristine and polluted environments. Her ongoing research seeks to evaluate the role of NOM in the mobilization of arsenic in groundwater in southeast Asia and sub-Saharan Africa. She is

particularly interested in issues related to water and sustainability in developing communities. Her research also probes questions related to the influence of atmospheric deposition on remote alpine ecosystems and, ultimately, water quality in headwater catchments.

Mladenov has two energetic children, ages 5 and 2, and is married to Ryan McGrath, a professional water resources engineer and Instructor in the department of civil engineering. Her hobbies include mountain biking, snowboarding and hiking.



Jeanette Grauerholz

Jeanette Grauerholz is K-State CE's new accountant. She manages the accounts of the department and various ongoing research projects. Grauerholz grew up in and lives in St. Mary's, Kan., and attended Washburn University. She brings book keeping and accounting experience from university and library settings.

Grauerholz's family includes her husband Dana, 19-year-old Laura and 22-year-old Travis, both KSU students, and 24-year-old Brett and his fiancée Emily, both 2011 KSU graduates. In her spare time Grauerholz likes to read, cook, shop and do antiquing. She says in the past months she has learned a lot of interesting engineering terms and



loves the smell of asphalt coming out of the CE labs because it reminds her of summertime road paving in her childhood.

Ryan McGrath

Ryan McGrath joined K-State CE as an instructor. He comes from Boulder, Colorado. Ryan spent most of his life in Colorado living in Golden, Boulder and Breckenridge and five years in Hawaii on the island of Oahu. Ryan is married to CE Assistant Professor Natalie Mladenov and they have two kids.

Ryan has several years of experience as a consultant with civil engineering firms. For the past 8 years he has been an owner of a company focused on surveying and geographical positioning systems.

Ryan enjoys bike riding and spending time outdoors with his kids whether it is swimming at the pool in the summer or sledding and skiing



in the winter. Ryan finds K-State CE interesting in the amount of opportunities students have outside the classroom to interact with other students, faculty and industry professionals.

KSU civil engineering fall banquet awards

ASCE Advisor of the Year:
Yacoub Najjar

ASCE Outstanding Faculty Award:
Mustaque Hossain

Chi Epsilon Student Advocate of the Year Award:
Mustaque Hossain

Chi Epsilon Undergraduate Teaching Excellence Award:
Yacoub Najjar

Outstanding Graduate Faculty Award:
Hayder Rasheed

Outstanding University and Professional Service Award:
Hani Melhem

Outstanding Research Award:
Bob Peterman

Outstanding Teaching Award:
Hayder Rasheed

Outstanding Freshman Award:
Carl Peterson

Outstanding Sophomore Award:
Dominic LaRoca

Outstanding Junior Award:
Xinchi Zhang (Spring 2011)
Jenny Swabb (Fall 2011)

Outstanding Senior Award:
John Handke (Spring 2011)
Gus Wuertz (Fall 2011)

Outstanding M.S. Award:
Mohammed Albahtiti

Outstanding Ph.D. Award:
Brandon Bortz

Outstanding Staff Award:
Danita Deters

Outstanding Colleague Award:
Dunja Peric

UTC Student of the year:
Wilson Smith

