

Civil Matters

Kansas State University Department of Civil Engineering

Spring 2015



From the department head



After serving for two years as interim, I consider it a distinct honor and privilege to have been appointed as your permanent department head. I extend my sincere thanks to all who have supported and encouraged me during this tenure, and I look forward to continuing to work with you in this new role.

Under the leadership of Dean Dawson, the coming few years promise to be exciting times for the department and college. I am truly pleased to have the opportunity to work with Dean Dawson and all of you in shaping the future of the department.

In this issue of Civil Matters, we present a summary of the department's activities and accomplishments over the past year. You will read about international scholars who are visiting our department, and

collaborating with our faculty on research related to earthquake and bridge engineering. You will read about the wide range of research projects being conducted by our faculty and their student collaborators. The accomplishments of our students and student organizations — who have showcased our educational and professional service activities at the state, regional, national and international levels — are also highlighted in this edition.

Our faculty, staff and students extend an open invitation to drop by for a visit. We'd love to chat with you and show you around the department.

Robert W. "Bobb" Stokes
Professor and Department Head

CE visiting scholars research quake and bridge engineering



Visiting scholar to focus on earthquake engineering

Mahdi Adibi has joined the CE department as a visiting scholar to pursue his research in the field of civil engineering with special interest in earthquake engineering. His Ph.D. is from Tehran University where he worked on topics related to seismic design of concrete structures, nonlinear modeling of structural elements, and seismic design and retrofit of bridges. His fields

of research at the International Institute of Earthquake Engineering and Seismology (IIEES), where he earned his M.S., included structural seismic rehabilitation, seismic performance of special structures, engineering seismology, hazard analysis and soil dynamics. Asad Esmaily, CE professor of structural engineering, serves as his supervisor at Kansas State University.

Bridge research spans common interests

The department of civil engineering is hosting Xuming Song as visiting scholar for a 12-month period that began in July 2014. Song is an associate professor at Central South University, Changsha City, China, in the School of Civil Engineering where he teaches courses on bridge engineering. Professor Hani Melhem provides research and professional directions to Song during his

stay at K-State, and serves as his research adviser in areas of mutual interest related to bridge engineering such as design and analysis of bridge structures, inspection and evaluation of load-bearing capacity of bridges, earthquake engineering and structural dynamics. In China, Song is involved in several new long-span, prestressed concrete bridge projects.



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Research highlights corrosion potential of backfill

Mechanically stabilized earth (MSE) retaining walls with aggregate backfill are commonly used by the Kansas Department of Transportation (KDOT). The corrosion potential of backfill must be determined for MSE walls with metallic elements, such as metal reinforcement, to reduce the risk of failure due to corrosion. The AASHTO T 288-12 standard is used to measure the electrical resistivity of soil to determine its corrosion potential. However, this current testing method was not designed for the aggregate backfill typically used in Kansas. As a result, the current test is believed to overestimate the corrosion potential which leads to more expensive and overly conservative designs. The objective of ongoing research at

K-State CE is to develop a field method for testing MSE wall backfill when aggregate is used and to characterize the corrosion potential of the aggregate.

Michael Snapp, a Kansas native from Dodge City, is the M.S. student working on this KDOT-sponsored project under the supervision of Prof. Stacey Kulesza. Preliminary results show the electrical resistivity field testing method can be used to measure the in situ bulk resistivity of aggregate backfill. It is anticipated that the work done through this project will provide an additional field technique to complement the AASHTO standard when aggregates are used.

Monitoring the electrical resistivity of an MSE wall during construction



Safety evaluation of bypass lanes in Kansas

Construction of bypass lanes at rural intersections has typically been considered a low-cost highway safety improvement by the transportation community. However, this needs to be quantitatively evaluated so decisions could be made on whether to continue with adding bypass lanes. Researchers at the CE department, Sunanda Dissanayake and Alireza Shams, have recently completed a study funded by the Kansas Department of Transportation (KDOT) on this topic.

Two common approaches used to evaluate the effectiveness of a treatment — before-and-after and cross-sectional, were both utilized in this study, using crash data obtained from the Kansas Crash and Analysis Record System database maintained by KDOT.

According to the before-and-after study, bypass lanes improve safety at unsignalized rural intersections. Total



A bypass lane

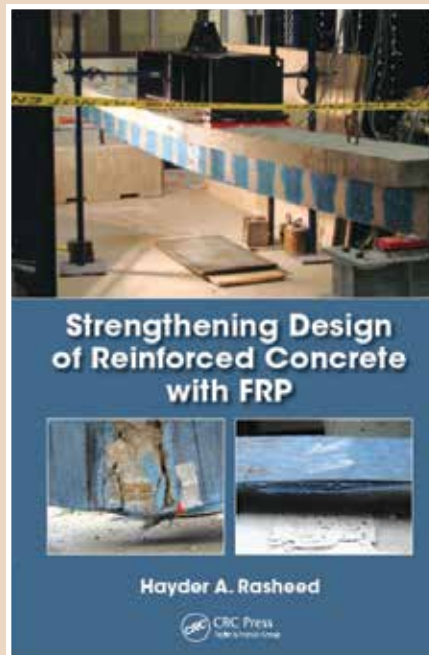
number of crashes and crash severity decreased after bypass lane additions, but these reductions were not statistically significant at a 95% confidence level for a majority of cases. For intersection-related crashes, however, a statistically significant reduction in crash rates occurred after the addition of bypass lanes at three-legged intersections. By lowering the confidence level to 90%, however, more categories

become significant for both three- and four-legged intersections. In the cross-sectional study, number of crashes and crash severities were lower at three-legged intersections with bypass lanes compared to three-legged intersections without bypass lanes, even though these reductions were not statistically significant at the 95% level. When considering a 300-ft. intersection box, statistically significant crash reductions occurred at four-legged intersections for all considered crash and crash rate categories. When considering the 90% level, crash reduction at three-legged intersections was also statistically significant when considering a 300-ft. intersection box.

Crash modification factors (CMFs) calculated to evaluate safety effectiveness of bypass lanes at unsignalized rural intersections in Kansas showed values less than 1.0 for almost all cases, indicating safety benefits of bypass lanes. Overall, this study concludes that bypass lanes are beneficial in improving safety in rural areas, even though they may not be advisable in high-volume conditions. Accordingly, there is no harm in continuing with the practice of adding shoulder bypass lanes at rural unsignalized intersections where volumes are relatively low.

CE professor publishes textbook

Professor Hayder A. Rasheed published a textbook titled “Strengthening Design of Reinforced Concrete with FRP.” The textbook establishes the art and science of strengthening design with fiber-reinforced polymers (FRP) beyond the abstract nature of design guidelines and research papers. Delivering a detailed treatment of all aspects of FRP strengthening design of reinforced concrete members, the book offers a depth of coverage ideal for senior-, master- and doctoral-level students. Rasheed is offering a graduate course on the subject in spring 2015 in which this book serves as the textbook.



Civil infrastructure systems laboratory

The civil infrastructure systems laboratory (CISL) located at 925 Carlson Drive, Manhattan, next to the K-State Advanced Manufacturing Institute (AMI), was developed jointly by the department of civil engineering at Kansas State University and the Kansas Department of Transportation (KDOT).

Accelerated pavement testing

CISL houses the accelerated pavement testing (APT) facility, an indoor space with approximately 5,000 sq. ft. of test area. A test frame, with a 42-ft. span, has a single or tandem axle assembly rolling at a speed of seven mph over pavement specimens up to 20 ft. long. The loading could be uni- or bi-directional. Axle load can be varied up to 24 kips on a single axle and 36 kips on a tandem axle. The frame has an enclosure allowing the air and surface temperature to be regulated during the test. Three reinforced concrete pits, six ft. deep and 20 ft long, are used to place the subgrade, base, instrumentation and pavement. Freeze-thaw cycles can be simulated in one pit. High temperature at the surface during testing is maintained by radiant heaters. CISL APT has the capability to test hot-mix asphalt (HMA) pavements for rutting or fatigue cracking, HMA thermal effects, reinforced aggregate base effectiveness, drainable base effectiveness, freeze/thaw cycling and pumping action in Portland Cement Concrete Pavement (PCCP).

CISL APT has conducted 17 tests since 1996 and the 18th experiment is underway. Current and past testing activities have been sponsored by the Midwest States Accelerated Testing Pooled Funds (APTF) Program consisting of state transportation departments of Iowa, Kansas, Missouri, Nebraska and New York, and private companies such as Tencate Geosynthetics. Currently, CISL APT is conducting an experiment to evaluate the bond between different asphalt layers as func-

tions of type and rate of emulsions used in bonding. Prof. Mustaque Hossain is the principal investigator of this project that is being sponsored by the Midwest States APTF Program.

CISL was featured in an article published in the March/April 2014 issue of the Public Roads magazine of the Federal Highway Administration (FHWA).

Accelerated freeze-thaw testing of concrete

This year, as part of a \$1.2 million study sponsored by the Federal Railroad Administration, CISL has acquired a custom chamber that is being used to assess the freeze-thaw resistance of concrete railroad ties in an accelerated manner. This chamber, one of the largest of its kind in the world designed for testing concrete, gives K-State the unique capability to research ways to improve the durability and sustainability of concrete infrastructure. The durability of concrete railroad ties exposed to three daily cycles of freezing and thawing for more than three months is currently being assessed using non-destructive pulse-velocity methods, giving students hands-on experience with state-of-the-art diagnostic equipment. Prof. Kyle Riding is the principal investigator of this project.



Ryan Benteman, CE research technologist, observes placement of concrete railroad ties for accelerated freeze-thaw testing at CISL.



Test sections being paved at CISL to test the bond between asphalt layers

Concrete canoe team heads to Lawrence for 2015 Mid-Continent Student Conference competition

The K-State concrete canoe team took its vessel "Cat Splash Fever" to the 2014 ASCE Mid-Continent Student Conference competition. Team captains, Nathan Pohl and Katlyn Dotson, led the team to 6th place out of the 12 teams that competed.

The University of Kansas in Lawrence will host the 2015 competition April 23-25. Team captains, Tyler Warren, Darren Meyer and Jacquelyn Ewald, are targeting a great performance at KU with this year's canoe "Free Willie." It will be painted to resemble an orca whale, accompanied by an ocean-and- beach-themed display.

Concrete canoe team membership this year is characterized by many new faces. One important goal was to increase interest and participation in the competition. Proximity of the 2015 competition will allow more students to attend. Viewing the final products displayed at competition is a unique and valuable experience that should pique the interest of civil engineering students in the department. The team hopes a positive experience at competition will improve member retention.

Having mostly new members, the concrete canoe team has decided to try out new ideas for the mix and the hull design. In contrast to the previous year, "Free Willie" will be crafted from a female mold. This means the concrete mix will be poured inside the mold as opposed to a male mold, where it is poured on the outside.

Decreasing weight of the canoe from the previous year is always a priority. Work was done to alter the mix design to find a lighter mix without sacrificing strength. Removing the ribs and gunwale from last year's design will reduce the amount

of concrete in the final product. With the length of 20 feet, "Free Willie" will emulate the hull design of a standard canoe.

For the 2015 competition, the concrete canoe team has decided to collaborate with the steel bridge team in the construction of a new sling. In the past, in order to transport the canoe, the team would buy a new sling every couple years. Since the steel bridge team proves to be a very suc-

cessful team, they provided consultation for the design and construction of a new sling that will serve future concrete canoe teams.

In order to compete in the ASCE national concrete canoe competition, many more innovative ideas need to be pursued. Team captains for the 2015/2016 season, Tyler Warren and Darren Meyer, are strong leaders and will help direct the team on the path of success.



Message from an advisory council member

'77 John Ahern

For the past six years I have had the honor to be a member of the K-State CE advisory council. This is my second time around as I was also on the council when it was formed in 1996. The experience both times has been excellent. I have worked with numerous deans, four CE department heads, faculty, staff and fellow council members, and met numerous students. I believe the council has been a positive addition for both the CE department and the College of Engineering.

I graduated in 1977 with a B.S. in CE. My entire professional career has been associated with the cooling tower

industry where I have been fortunate to have had a variety of experiences since graduation. I am currently the vice president of EvapTech Inc. in Lenexa, Kansas.

The CE department is in the midst of exciting times. Enrollment is up and job opportunities are available. A civil engineering degree from K-State prepares graduates for the next step. Good wishes to all and thank you for the opportunity and friendship.



2014 Professional Progress Award recipient



Paul Deitering, Topeka, Kansas, is a 1994 graduate of Kansas State University in civil engineering, and has degrees in civil and survey technologies from K-State-Salina. He is an engineering manager in the transportation division with Bartlett & West where his responsibilities include design, CADD management and oversight of roadway plan production. He is currently working on the I-70 highway realignment project in downtown Topeka and leads the local street network redesign effort. Before joining Bartlett & West 10 years ago, Deitering worked for the Kansas Department of Transportation in the bureau of design, road section. While there, he designed and provided oversight for consultants working on state highway projects. He serves as treasurer of the local Sunflower State Professionals Chapter of Engineers Without Borders – USA; enjoys tutoring at-risk elementary school students in reading and math; and is a member of the American Society of Civil Engineers, Chi Epsilon and the K-State Alumni Association.

ASCE chapter update

The ASCE student chapter was hard at work in 2014. The Konza Prairie trail bridge restoration service project garnered a significant amount of student involvement. A group of students surveyed the terrain and assisted in designing a new footpath.

The chapter has added the position of community service chair to its list of officers. This person will be responsible for gathering opportunities for

the chapter to participate in and around the Manhattan area. The new community service chair will also be working on increasing the chapter's involvement with professional societies. Throughout the fall 2014 semester, the community service chair was in touch with the Boys and Girls Club in order to give a brief presentation on civil engineering.

On Nov. 14, 2014, the K-State ASCE student chapter hosted the

Chi Epsilon news

2014 was a busy year for Chi Epsilon. In the spring, they held a concession stand fundraiser in the engineering atrium. Chi Epsilon welcomed Mary Madden, Benjamin Nye, Taylor Smith, Lisa Shofstall, Christopher Shultz, Edward Vadbunker and Seth Weber as new members. The chapter also inducted Dave Karnowski, CE '71, as a chapter honor member. The spring service project involved picking up trash from campsites at Tuttle Creek State Park. James Scott attended National Conclave in Salt Lake City, Utah. He brought back many great ideas to better our chapter and increase student involvement.

In the fall, the chapter offered advising help to freshmen to prepare them for meetings with advisers. Chi Epsilon also participated in basketball cleanup fundraisers at Bramlage Coliseum. The chapter inducted Mohammed Albahtiti, Lauren Erickson, Seth Heronemus, Austin Jueneman, Luis Miguel and Yadira Porras as new members. Along with these new members, Chi Epsilon also welcomed Prof. Hani Melhem as faculty adviser. The fall service project involved picking up and sorting food at the Flint Hills Breadbasket.

annual KSU/KU joint dinner, with Benedictine College, Atchison, Kansas, also in attendance. Calvin Reed, CE '00, spoke at the event about the increasing problem with vehicular collisions with bridge structures and how the state of Kansas is working on improving the problems.

Chapter advisers are Professors Kyle Riding and Asad Esmaeily.

From the roof to the road — new life for roofing shingles

Asphalt shingles account for almost 80% of residential roofing applications in the United States. Reroofing produces seven to 10 million tear-off shingles that are mostly disposed of in landfills.

Common asphalt shingles are 30 to 35 percent asphalt, five to 15 percent mineral fiber and 30 to 50 percent mineral granules. Fiber-glass shingles have lesser amounts of asphalt at 15 to 20 percent, with other constituents at similar percentages. The asphalt content of tear-off shingles is higher than new shingles because they have lost a portion of their surface granules due to weathering.

Since the shingles contain 20 to 35% asphalt binder and other materials such as fine aggregates that can be reused in asphalt pavements, there has been growing interest in recycling asphalt shingles (RAS) for paving applications. The most significant savings would come from disposal fees which range from \$20 to \$30 per ton. The National Asphalt Pavement Association estimates cost savings to be between \$1.00 and \$2.80 per ton when using five percent shingles in asphalt mixtures.

The Kansas Department of Transportation (KDOT) first used asphalt shingles on a project on US-59, south of Lawrence, in 2012. Since then

KDOT has been permitting use of tear-off roofing shingles on more projects. Although use of RAS in asphalt mixtures has become more widespread in recent years, especially due to an increase in binder prices and sustainability awareness, the effect of this material on long-term pavement performance is not well established.

KDOT is sponsoring a research project at K-State, supervised by Prof. Mustaque Hossain and conducted by master's student Masoumeh Tavakol, to establish guidelines on use of RAS in Kansas. These guidelines will ensure long-term performance of asphalt pavements from this green practice.



Tear-off roofing shingles are ground to have a smaller size gradation for use in asphalt mixtures.



Tear-off roofing shingles being processed for use in asphalt mixture (Photo credit: LL Pelling Co.)



Civil engineering master's student, Masoumeh Tavakol, gets ready to compact an asphalt mixture containing RAS in the superpave gyratory compactor.

Comprehensive support advances civil engineering goals

BARTLETT & WEST

Although Bartlett & West has engineering and technology offices across 10 states, it emphasizes community support in each local area. With an office location in Manhattan, Kansas, the firm has a long history of comprehensive support for Kansas State University's department of civil engineering.

"We really focus on a diversity of giving," said Keith Warta, president of Bartlett & West. "It's about supporting students, supporting faculty and then creating a lasting facility that will help many people into the future."

That support creates more opportunities for students like Luke Augustine, a sophomore from Salina, Kansas. Receiving the Bartlett & West, Inc. Civil Engineering Scholarship this year alleviated financial pressures and allowed Augustine to focus his free time on playing trumpet in the K-State

marching band.

"Scholarships help a lot because it makes having a part-time job less crucial and I can instead devote time to being more involved on campus," Augustine said.

In addition to financial support for civil engineering students, facilities, programs and general excellence, Bartlett & West also hires many interns from K-State. The interns learn about daily operations in an engineering firm as well as the company culture of community support.

"In addition to applying business and engineering principles to our daily work, we also involve interns in community

projects like Habitat for Humanity," Warta said.

Warta, a fourth-generation K-Stater who earned a civil engineering degree in 1984, said he thinks the future will bring an increasing demand for skilled engineers. Emphasizing additional skills during college such as collaboration, teamwork and relationship building will produce highly qualified future employees.

"As we move toward our K-State 2025 goals, we are focused on comprehensive excellence," said Robert Stokes, professor and head of the department of civil engineering. "Well-rounded support from generous partners like Bartlett & West help make that possible."

How you can help

To learn how you can make a difference for the College of Engineering's people, places and programs, please contact the engineering development office at 785-532-7609 or danielley@found.ksu.edu.

How much asphalt can you recycle?

More than 90 percent of about 2.5 million miles of paved roads in the U.S. are constructed with hot-mix asphalt (HMA). As these roads age during years of service, they must be rehabilitated. The Federal Highway Administration (FHWA) supports and promotes use of recycled highway materials in pavement construction in an effort to preserve the natural environment, reduce waste and provide a cost-effective material for constructing highways. As of 2007, more than 80 percent of HMA pavements were recycled in the U.S. making asphalt the most frequently recycled material.

The Kansas Department of Transportation (KDOT) uses hot-in-place recycling (HIR), a recycling method for HMA pavements that preserves or maintains distressed asphalt pavements while minimizing use of virgin binder and aggregates. In the HIR process, the existing HMA surface is heated right

before milling, mixed with a range of new materials and additives to improve the properties of the recycled asphalt pavement (RAP), and finally places and compacts as a new surface, all in one continuous operation. The process currently uses anywhere from 80 to 100 percent RAP.

Nassim Sabahfar, CE doctoral student, is studying the effects of ad-

ditives added during the HIR process on future pavement performance in a KDOT-sponsored study. She is being advised by Mustaque Hossain, CE Munger professor. Sabahfar is studying the mechanical and rheological impacts of various additives on HIR performance. The state-of-the art research will soon establish guidelines on use of different additives in the HIR process in Kansas.



Doctoral candidate, Brandon Bortz, waits to sample materials as the HIR train heats, scratches, breaks and replaces old asphalt pavement on K-14 with a new layer.

Engineers Without Borders take on school project in Guatemala

This January, the Kansas State University chapter of Engineers Without Borders (EWB) embarked on its first assessment trip since 2009. A team of five students including Casey Mahoney, CE, and a local professional engineer, Peter Clark, CE '06, travelled to Guatemala, inaugurating a partnership with the Joyabaj municipality. Employing a diverse skill set, the team assessed the viability of a project to construct a new school through meetings with key stakeholders and a comprehensive site analysis.

Students in El Amate, a small rural community in Joyabaj, faced many obstacles keeping them from regular school attendance. Heavy floods during the rainy season paired with a long commute by foot forced them to miss school often. Concerned about the safety and education of their children, community members recently mobilized to build a school that was closer and more consistently accessible for their children. Bringing together the limited materials on hand, the resilient community assembled a structure comprised of corrugated metal sheets supported by branches. Although functional, it was not structurally sound in the seismic-prone region. Lacking electricity, windows and flooring, the school was a clear fit with the mission of the EWB chapter.

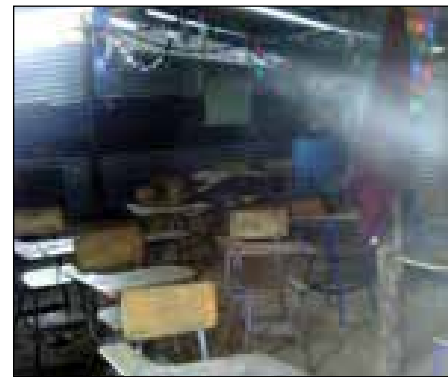
The team met with community stakeholders, the Ministry of Education, and the mayor of Joyabaj, establishing its commitment to designing a school that is clean and safe, with the capacity to hold all members of

eligible school age. With only a week to complete the assessment, time between meetings was spent gathering data for the site analysis. Survey data was collected with a clinometer, measuring tape and GPS. CE Professor Eric Fitzsimmons helped the team turn data into a topographic map in AutoCAD Civil 3D. Lacking access to advanced lab equipment, Octavio Tejeda, a professional geotechnical engineer from Wisconsin, led an improvised soil analysis. With great enthusiasm, he instructed the team to use their senses: listening to, observing and touching the soil to determine its composition. Although the team did not taste the soil, they were instructed to spit into their hands to carry out an Atterberg Limit test.

The community was beyond grateful for the improved educational opportunity, and the team received an invaluable educational experience. The plan is to complete the school

“The engineering job market is rich with analysts, but members of EWB are set apart because the projects give them the chance to showcase their innovation.”

— Mike Paddock, EWB professional



design this semester, with a groundbreaking scheduled for August.

“In school you are taught problem solving. The engineering job market is rich with analysts, but members of EWB are set apart because the projects give them the chance to showcase their innovation,” Said Mike Paddock, professional member of EWB involved with student-led projects in Joyabaj and civil engineer for CH2M-HILL. “There is a difference between learning how to design a school, and learning how to design a school with what we have here in Guatemala.”

High-speed railway lines focus of K-State engineering research team

Prestressed concrete railroad ties — an essential component for higher speed railway lines — are becoming increasingly popular in the United States. In order for these ties to function adequately over their expected service life, the prestressing force must be fully transferred into the railroad tie at a distance less than 1.5 feet from the end of the tie.

Research at Kansas State University, under the direction of Robert Peterman,

professor of civil engineering, along with Terry Beck, professor of mechanical and nuclear engineering, and John Wu, associate professor of industrial and manufacturing systems engineering, evaluates the best combinations of concrete and prestressing steel to meet this objective and ensure long-term performance of the ties.

Both graduate and undergraduate engineering students have been involved in conducting this experi-

mental research as part of a \$2.1 million multi-disciplinary project being funded by the Federal Rail Administration, LB Foster/CXT Concrete Ties and the Kansas State University Transportation Center.

Results from concrete railroad tie research by the K-State team include one patent and the publication of 25 peer-reviewed articles since 2011.

2014 fall CE banquet awards

ASCE Outstanding Faculty Award
Robert Peterman

ASCE Outstanding Advisor of the Year
Asad Esmaeily

Chi Epsilon Student Advocate of the Year Award
Hani Melhem

Chi Epsilon Undergraduate Teaching Excellence Award
Sunanda Dissanayake

Outstanding Graduate Faculty Award
Asad Esmaeily

Outstanding M.S. Award
Jan Vosahlik

Outstanding Ph.D. Award
Fateme Shirmohammadi

Outstanding Staff Award
Sue Wells

Outstanding Colleague Award
Hani Melhem

Outstanding University and Professional Service Award
Asad Esmaeily

Outstanding Research Award
Sunanda Dissanayake

Outstanding Teaching Award
Dunja Perić

Steel bridge scores well at regional, makes national appearance

The 2014 K-State steel bridge team, led by Cale Armstrong and Robert Schweiger, placed third overall at the regional competition at Oklahoma State University in Stillwater. The bridge took first in display; third in construction speed with 11.4 minutes; second in lightness at 180 lbs; fourth in aggregate deflection with 6.688 inches; third in efficiency at \$30,277,500; and third in economy at \$9,707,500.

Construction economy is based on build time and number of builders. Efficiency is based on weight and aggregate deflection. The bridge is given an overall score, which is the economy plus the efficiency. By placing in the top three at regionals, the team went on to the University of Akron

in Ohio for the national competition, where most categories were improved upon. By adding members to the bottom of the spans, deflection was cut in half, which greatly improved efficiency, and the team finished 21st overall out of 47 teams.

Don Powers and Eric Hamilton plan to take the bridge “Steel Willie” to an 11th straight national appearance. The 2015 regional will be held at KU, April 24-25 and nationals will be at UMKC, May 22-23. Fabrication on this year’s bridge began in February with hopes to be completed during spring break. The bridge will be a single-span space truss. Rule changes this year allow dovetail connections, which will speed up build time.



Student achievements

- The 12th Capitol Graduate Research Summit will feature 10 K-State graduate students, including **Jan Vosahlik**, CE.
- **Ishani Dias** and **Syeda Aziz**, CE grad students, each presented a paper at the 94th Annual Transportation Research Board meeting in Washington, D.C. Their adviser and co-author is **Sunanda Dissanayake**, CE professor, who also presented two papers at the meeting based on research completed during her recent overseas sabbatical leave.
- **Nassim Sabhafar**, CE doctoral student working with **Mustaque Hossain**, has been named the 2014 Mid-America Transportation Center Student of the Year and was honored at the Council of University Transportation Center Awards Banquet in January in Washington, D.C.
- **Yadira Porras**, received \$2500 as one of four recipients of the Engineering Research Experience for Undergraduate Awards for 2014-2015. Porras worked with Assoc. Professor **Kyle Riding** on "Early-age thermal stress development of rapid concrete repair materials."
- Civil engineering seniors **Jennifer Sommerfeld** and **Noura Saadi** attended the American Society of Civil Engineers /Engineers Without Borders "Design Global Engineer" conference and workshop Oct. 4-10 in Panama City, Panama.

Graduate student council plans activities

The Civil Engineering Graduate Student Council (CEGSC) helps graduate students in civil engineering by organizing new student orientations, student activities, and welcome and farewell parties each semester. In 2014, the CEGSC arranged multiple potluck picnics for graduate students and

faculty in the department at the Frank Anneberg Park in Manhattan. These events resulted in a large turnout in an informal environment. The council also participated in the All-University Open House last spring where CEGSC officers described the various attributes of civil engineering research to attendees.



Civil engineering graduate students and faculty at potluck picnic.

Civil engineering advisory council

John H. Ahern — Evap Tech Inc.
Don Allison — Burns & McDonnell
Greg Allison — MKEC Engineering Consultant Inc.
Darold Davis — Garver LLC
Brad Fagan — Schwab Eaton PA
Gregg Greenwood — Professional Engineering Consultants PA

Jeff Hancock — SMH Consultants PA
Gary Janzen — City of Wichita
Catherine Patrick — KS Department of Transportation
Cathy Ritter — Constellation Design Group Inc.
Karla Waters — Wilson and Company Inc.
Jerry Westhoff — JJ Westhoff Construction Company

Faculty awards and news

- **Mustaque Hossain** has been named the Clair A. Mauch Steel Ring Advisor of the year.
- **Mustaque Hossain** has received the Professorial Performance Award
- **Mustaque Hossain**, has been appointed as visiting professor on the faculty of civil engineering at Universiti Teknologi-MARA, Shah Alam, Malaysia, for 2014-2016.
- **Robert Peterman** has received the Professorial Performance Award.
- **Robert Peterman** has been named Fellow of the Precast/Prestressed Concrete Institute.
- **David Steward** has received the Frankenhoff Outstanding Research Award.
- **David Steward** has received the Deans' Award of Excellence.
- **Kyle Riding** has received the Deans' Award of Excellence.
- **Sunanda Dissanayake** has been promoted to full professor.
- **Sunanda Dissanayake** has been elected to University Graduate Council.
- **Asad Esmaeily** has been promoted to full professor.
- **Dunja Perić** has been named Visiting Fellow at University of New South Wales, Sydney, Australia.
- **Alexander Mathews** received an inaugural Kansas State University Oz to Oz Fellowship for travel to and study in Australia.
- **Steve Starrett** has been elected vice president of ASCE's Environmental and Water Resources Institute (EWRI).

ITE chapter activities

The student chapter of the Institute of Transportation Engineers (ITE) promotes the transportation field in the civil engineering department. The chapter allows both undergraduate and graduate students to explore different sub-disciplines of transportation by inviting local practitioners, researchers and public agencies to present topics and projects to the students.

In spring 2014, members of the students ITE chapter visited Bartlett & West in Topeka, Kansas, to see first-hand how transportation is used in business at a private consulting firm. **Scott Uhl**, CE '92, and **Nathan Bergman**, CE '02, spoke about their most recent complex project, the Quincy Viaduct project on Interstate 70 through Topeka.

Students in the chapter also traveled to the 2014 joint Western-Midwestern ITE District Annual Meeting in Rapid City, South Dakota. **Alireza Esfandabadi** and **Syeda Aziz** presented their research during

the conference and won awards for the best student posters. This semester, the chapter is planning to attend the ITE Midwestern District Conference in Branson, Missouri. The chapter plans to participate in the ITE collegiate student traffic bowl under the guidance of co-faculty adviser **Eric Fitzsimmons**.

The ITE student chapter welcomed two excellent speakers last semester, including a talk about railroads in the United States by **Eric Fitzsimmons**,

CE visiting assistant professor at K-State, and a research project about naturalistic driving study data used to assess drivers at horizontal curves by **Shauna Hallmark**, CE professor and director of the Institute for Transportation at Iowa State University. This semester the student chapter will welcome more speakers from the transportation industry, as well as organize social activities and field visits.



K-State ITE student chapter members and faculty adviser, **Bobb Stokes**, second from upper left, at the joint Western-Midwestern ITE District Annual Meeting, Rapid City, South Dakota.

Women in Civil Engineering

The women of WiCE, or Women in Civil Engineering, strive to encourage women in the fields of science and engineering. We facilitate academic success through workshops, team-building exercises, mentoring, industry field trips and social events. WiCE seeks to provide the resources

necessary for women to excel in academia and professional development. Our mission is to increase awareness and interest in engineering among the female population. Also, we shall provide a sustainable networking system within the Kansas State University College of Engineering.



WiCE Members with **Donald Allison**, CE '82, during their visit to Burns & McDonnell.

Grad student wins poster competition



Syeda Rubaiyat Aziz, CE graduate student, placed in the top three for her poster "Significance of weather adversity on motor vehicle-related crashes in

Kansas" at the 2014 Joint Midwestern and Western District ITE Annual Conference in Rapid City, South Dakota. Her adviser is **Sunanda Dissanayake**, CE professor. Students from 24 states participated in this joint meeting/poster competition.

Aziz also received the \$700 International Coordinating Council Scholarship for 2014, awarded through the International Coordinating Council and International Student and Scholar Services.

2014-2015 scholarship and award recipients

Johnathan Allen — Rathbone Scholarship Fund
Tyler Anderson — Moritz and Selma Auerbach Scholarship

Matthew Anthony — D. Dean and Nancy E. Kays Engineering Scholarship, R.D. and Mary C. Andersen Scholarship

Luke Augustine — Bartlett & West Inc. Civil Engineering Scholarship

Megan Ball — E.C. Lindly Scholarship for Engineering Students, Karl J. Svaty Memorial Engineering Scholarship

Samuel Brown — Dean O. and Lavon Morton Engineering Scholarship

Jack Cantele — Robert McKay Engineering Excellence Fund

Brett Champlin — Hal and Mary Siegele Scholars Fund

Caleb Childs — G.E. Johnson Engineering Scholarship

Adam Chinery — Beavers Heavy Construction Scholarship, Civil Engineering Excellence Scholarship

Christopher Christensen — Alfred Walton Johnson Memorial Scholarship, Dow-KSU Alumni Engineering Scholarship, Orville “Butch” and Doris Spray Family Civil Engineering Scholarship

Brady Crites — Chas Turnipseed Memorial Fund, Ralph and Dora Rogers Memorial Scholarship

Jacob Cronenwell — Chas Turnipseed Memorial Fund, Steven C. Butterworth Scholarship, Walter M. and Alice K. Bellairs Scholarship

Abraham Cullom — Hal and Mary Siegele Scholars Fund

Lauren Erickson — Alan and Sharon Sylvester Civil Engineering Scholarship, Fred W. and Martelle W. Nussbaumer Engineering Scholarship

Abraham Fangman — Jim and Pat Guthrie Civil Engineering Scholarship, Ralph and Dora Rogers Memorial Scholarship

Andrew Foerster — Kendell Aileen Sobering Memorial Scholarship

Allison Franken — Paulson Civil Engineering Student Excellence Award

Dalton Funk —Terry S. King Engineering Leadership Scholarship, Walter M. and Alice K. Bellairs Scholarship

Christopher Gaston — Jeanne M. and Edward J. Mulcahy Scholarship, Ralph and Dora Rogers Memorial Scholarship

Claudia Gonzalez — Dolese Brothers, Loyal and Jill Huddleston Civil Engineering Scholarship, Shelby K. Willis Civil Engineering Scholarship

Neil Haas — Coen Family Civil Engineering Scholarship

Baily Herron — Ralph and Dora Rogers Memorial Scholarship Fund

Samantha Hinrichs — Edmond E. Young Scholarship, Richard L. Clarke Scholarship, S.H. Brockway Memorial Scholarship Fund

Brady Hoffman — Coonrod Memorial Civil Engineering Scholarship

Jerald Hulsing — Dolese Brothers

Roben Inman — Dolese Brothers

Austin Jueneman — Mick and Nancy McAuliffe Civil Engineering Scholarship

Caleb Jurey — Kevin and Dianne Honomichl, Loyal and Jill Huddleston Civil Engineering Scholarship

Casey Keller — Bartlett & West Inc. Civil Engineering Scholarship

Corey Kingsland — Alok Bhandari Civil Engineering Scholarship

Cash Kramer —Jim and Pat Guthrie Civil Engineering Scholarship, Charles Freund Memorial Scholarship, Ralph and Dora Rogers Memorial Scholarship

Alexandra Lee — Ralph and Dora Rogers Memorial Scholarship, Stephen and Karen Clegg Engineering Scholarship, Tointon Family Scholarship

Weston Loehr — Ralph and Dora Rogers Memorial Scholarship

Boaz Love — Ralph and Dora Rogers Memorial Scholarship

Nathan Lubeck — Coonrod Memorial Civil Engineering Scholarship

Mary Madden — Coonrod Memorial Civil Engineering Scholarship

Mark Mathis — Dolese Brothers

Darren Myers — Dolese Brothers, Ralph and Dora Rogers Memorial Scholarship

Luis Miguel — Warren and Mary Lynn Staley Engineering Excellence

Caleb Mitchell — Ralph and Dora Rogers Memorial Scholarship

Kevin Moluf — Brungardt Honomichl and Company, PA Civil Engineering Scholarship, Clair A. Mauch Scholarship in Civil Engineering

Blake Moris — Edward L. Wilson Civil Engineering Scholarship, Ralph and Dora Rogers Memorial Scholarship

Austin Muckenthaler — Ralph and Dora Rogers Memorial Scholarship

Benjamin Nye — Ralph and Dora Rogers Memorial Scholarship

Jack Olson — Ralph and Dora Rogers Memorial Scholarship

Jacob Paperi — Dolese Brothers, Ralph and Dora Rogers Memorial Scholarship

Brandon Penner — Hal and Mary Siegele Scholarship Fund

Luke Peter — Coonrod Memorial Civil Engineering Scholarship

Yadira Porras — Engineering Scholarships Fund

Donald Powers — Bruce E. Roberts Scholarship

Dalton Savage — Jerry J. Jones and Larry L. Jones Memorial Scholarship, Kenneth and Maria Rector Scholarship in Civil Engineering, Ralph and Dora Rogers Memorial Scholarship

Barrett Schmidt — Dolese Brothers

James Scott — Chas Turnipseed Memorial Fund

Robert Sherwood — Chas Turnipseed Memorial Fund

Lisa Shofstall — E. William Ulrich Scholarship, Stephen and Deloris Berland Civil Engineering Scholarship

Christopher Shultz — Forrest Faye and John Warren Frazier Scholarship, Ralph and Dora Rogers Memorial Scholarship

Jennifer Sommerfeld — Albert Niu Lin Scholarship in Civil Engineering

Michael Stancic — Dolese Brothers, Ralph E. Brown Engineering–Dean’s Excellence

Andrew Talkin — Everett J. and Marilyn J. Cupps Civil Engineering Scholarship, Ralph and Dora Rogers Memorial Scholarship

Braden Taylor — Coonrod Memorial Civil Engineering Scholarship

Sergio Valenzuela — Dolese Brothers

Kaitlin Walbridge — Coonrod Memorial Civil Engineering Scholarship

Elena Watson — Engineering Scholarships Fund, ‘Red’ Web Sproul Memorial Scholarship

Seth Weber — Chas Turnipseed Memorial Fund

Thomas Wellemeyer — Audrey A. Potter Memorial Scholarship in Engineering, Orville “Butch” and Doris Spray Family Civil Engineering Scholarship

Ashton Wherry — Chas Turnipseed Memorial Fund

Jared Yost — Bruce E. Roberts Scholarship, L.W. Newcomer Scholarship

Educational objectives and student outcomes

The civil engineering B.S. program at Kansas State University was first accredited by the Accreditation Board for Engineering and Technology (ABET) in 1936, the first year accreditation was given for engineering programs. K-State’s CE program has been regularly accredited since then. The last ABET general review was in fall 2011.

ABET program educational objectives

The educational objectives of the civil engineering program at Kansas State University are that most graduates, within three to five years, will—

1. Be successful in their civil engineering careers; and
2. Pursue professional development, advanced degrees and registrations as appropriate for their careers.

ABET student outcomes

- (a) an ability to apply knowledge of mathematics, science and engineering;
- (b) an ability to design and conduct experiments, as well as to analyze and interpret data;
- (c) an ability to design a system, component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability;
- (d) an ability to function on multidisciplinary teams;
- (e) an ability to identify, formulate, and solve engineering problems;
- (f) an understanding of professional and ethical responsibility;
- (g) an ability to communicate effectively;
- (h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and social context;
- (i) a recognition of the need for, and an ability to engage in, life-long learning;
- (j) a knowledge of contemporary issues; and
- (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.



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Summer 2015

- CE 333 Statics
- CE 703 Responsibility in Engineering: Codes & Professionalism
- CE 704 Responsibility in Engineering: Leadership & Diversity
- CE 752 Advanced Hydrology
- CE 816 Selected Topics in Civil Engineering

Fall 2015

- CE 654 Design of Groundwater Flow Systems
- CE 690 Select Top/Civil Eng – top/Basics of Eng Ethics
- CE 732 Advanced Structural Analysis I
- CE 745 Structural Dynamics
- CE 751 Hydraulics of Open Channels 1
- CE 773 Hot Mix Asphalt Mixture Design and Construction
- CE 775 Traffic Engineering
- CE 786 Land Development for Civil Engineers and Planners
- CE 802 Advanced Mechanics of Materials and Applied Elasticity
- CE 816 Selected Topics in Civil Engineering
- CE 822 Shear Strength and Slope Stability of Soils
- CE 861 Environmental Engineering Chemistry

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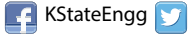
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