Department of Civil Engineering, Kansas State University

Civil Matters

April 2003, Volume 3, Issue 1

ASCE chapter active in 2002

Inside this issue:

The canoe team with their boat The Viking Voyager at Norman, Okla.

In late April, the KSU ASCE Concrete Canoe and Steel Bridge Teams traveled to Norman, Okla., to participate in the 2002 Mid-Continent Regional Conference hosted by the University of Oklahoma. It was there that hundreds of hours of preparation by both teams came to fruition. Though some goals were not met, both teams competed and represented K-State well. The concrete canoe team won the Spirit of the Competition award and took third place overall.

The chapter also sent a contingent to the first ever ASCE National Student Conference in Madison, Wisc., this past June. Among other things, these students brought back valuable ideas for hosting the 2003 Mid-Continent Regional Conference at K-State.

The burgers were hot, but the rain was cold this year at the fall picnic in Anneberg Park, as a game of mud-football followed the meal.

The chapter conducted two highway cleanups and made members available to the city of Manhattan for help with projects. ASCE also adopted a family for Christmas and provided them with holiday gifts.

KSU to host 2003 ASCE Regional Conference

The KSU ASCE Student Chapter will host the 2003 Mid-Continent Regional Conference, April 23–26, 2003, in Manhattan. This annual conference will bring together ASCE student chapters from the states of Kansas, Nebraska, Missouri, Illinois, Oklahoma, and Arkansas. The conference is designed to give CE students an opportunity to network and participate in a variety of competitions.

Events planned include the steel bridge competition, concrete canoe competition and races, K'nex, concrete bowling, and mystery competitions. Participants can also attend academic and technical presentations, and the Mead student paper presentation. An awards banquet is scheduled for April 25.

Mike Stein and Christopher Harker, graduate students in CE, will serve as co-chairs of the conference planning committee. Several KSU CE alumni will participate through financial contributions, by organizing events, and participating as judges for various competitions.

Information about the conference is available on the CE department Web site at *www.engg.ksu.edu/CEDEPT/asceConf2003/index.htm*

Editors

Alok Bhandari
Lakshmi N. Reddi

News from the department head

Lakshmi N. Reddi, prof. and head of civil engineering

Welcome to the third issue of *Civil Matters*. This has been a year of financial crises. Much like other land-grant institutions, K-State has suffered from severe budget reductions and call-backs. Our department has taken its share of the beating. Our operating expenditures have been reduced, we lost one laboratory technician's position, and our grading/teaching support has been drastically reduced. Surviving these stringent measures has been a challenge this year, and our faculty have handled it gracefully.

On the bright side (yes, there's a bright side), we have undertaken a review of our educational objectives. Our goal has been to revisit our teaching mission and identify what we want our graduates to become. Bobb Stokes, prof., in his capacity as the undergraduate program director, has led the discussion on these objectives. Our advisory council and student leaders also participated in the development of these items. We are in the process of reviewing learning outcomes that would allow us to assess how well we are meeting these objectives.

CE Advisory Council

The CE advisory council, L to R, Eric Siew, Ed Wambsganss, Lakshmi Reddi, William Stannard, Kevin Honomichl, Jeri Meyer, Richard McReynolds, Jane Jordan, Randall Sylvester, Bob Snell, and Kerry Moore met at their annual fall meeting.

As detailed elsewhere in this newsletter, our enrollments are steadily increasing, both in the undergraduate and graduate student categories. Civil engineering agencies and industries in the region continue to show interest in recruiting our students. Placement of our graduates has consistently been close to 100%. Our faculty continue to be active in research and professional activities. Our annual extramural research funding is about $1.7 million (an average of $115k/faculty/year). We are joined by two new faculty members this year—Dr. Asad Esmaeily, in the structures area, and Dr. Sunanda Dissanayake, in the transportation and materials area.

Our advisory council and our professional academy members have been very supportive of our operations throughout this difficult period of budget cuts. We have a steady stream of CE practitioners visiting our classes (CE 101 – Introduction to Civil Engineering, and CE 015 – Assembly) and acquainting our students with elements of CE professional practice. On behalf of our faculty and students, I thank our advisory council and our professional academy members for taking such an active interest in our program.

Best wishes.

Lakshmi N. Reddi

Lakshmi N. Reddi

Zero-gravity research for NASA project

Lakshmi Reddi, prof., is a principal investigator of a three-year study to help the National Aeronautics and Space Administration (NASA) identify important factors controlling water flow in soils under micro- and zero- gravity. This study deals with water flow at the scale of water bubbles trapped in soil. Computer imagery is being used to capture the images of water and air bubbles trapped in soils, and to understand the forces necessary to mobilize these bubbles.

NASA has granted additional funding to support a KC-135 flight experiment, which takes a parabolic flight path at an altitude of about 30,000 feet to create zero-gravity in the flight cabin for 25 seconds. Reddi's team, which includes research scientists from Utah State University, University of Connecticut, Glenn Microgravity Research Laboratory, and Case Western University, took four flights in early February '03, with each flight accounting for 40 parabolic flights.

Results from these zero-gravity experiments are being analyzed to draw preliminary conclusions on the factors controlling flow of water and air under zero gravity. Results from this study will be used by NASA to design plant-growth chambers in its pursuit to explore life support in outer space.

Chi Epsilon increases recruiting efforts

Chi Epsilon was proud to initiate 17 students into its group in 2002. The students initiated include Jamie Klein, Clay Center; Michael Terry, Atwood; Karen Lucio, Monterrey NL, Mexico; Crystal Ackerman, Dodge City; Matthew Holopirek, Otis; James Petersen, Lincoln, Neb.; Jason Crabtree, Topeka; Matthew Raveill, Kansas City; Harold Barkman, Kansas City; Tricia Petr, Blue Rapids; Kelly Cool, Topeka; Ryan Farmer, Manhattan; Derek Hake, McPherson; Kelly Carlton, Lansing; Sally Bosak, Topeka; Jarred Green, Paola; and Russell Yarnell, Lucas. There are now 26 XE members.

Two outstanding K-State alumni were elevated to the status of Chapter Honor Member. These were James Tadtman (BSCE '67) of Wildcat Construction Co. and Larry W. Emig (BSCE '66, MSCE '82) of KDOT.

Spring 2003 officers include Lance Harter, president; Bryce Barkus, vice president; Crystal Ackerman, treasurer; Slade Engstrom, secretary; Ryan Farmer, pledge marshall; and Luke Williams, newsletter editor. Hayder Rasheed, asst. prof., is the XE faculty advisor.

National recognition from ASCE

Dave Karnowski (BSCE '71), received the 2002 Outstanding Practitioner Advisor Award for Zone III.

The KSU Student Chapter and Chapter Advisor, Alok Bhandari, asst. prof., were awarded Certificates of Commendation for Zone III, 2002.

More ASCE awards

Robert Stokes, prof., received the chapter's Outstanding Faculty Award for 2002.

Jessica DePriest (BSCE '02) was the recipient of the Student Chapter Vernon Rosebraugh Award.

Student awards

Alexander Darby, senior in CE

Russell Yarnell, senior in CE

Alexander Darby, Topeka, senior in CE, was elected to the executive board of the National Association of Engineering Student Council. Darby will represent 110 engineering university councils across the nation and serve as vice president of finance for NAESC. Darby also received the 2002 Kansas Water Environment Association Scholarship and participated in the state of Kansas 2002 Governor Internship Program.

Russell Yarnell, Lucas, senior in CE, was awarded a McNair Scholarship in 2002. McNair Scholars dedicate their efforts to higher education by choosing graduate study and academic research as career objectives. Yarnell was also a recipient of the Clair Mauch Scholarship in 2002.

Bryce Barkus, Manhattan, senior in CE, was awarded the Kansas County Highway Association and the ASCE Wichita Branch scholarships. Barkus was also a recipient of the Albert Niu Lin Scholarship, Walter Bellairs Scholarship, and the Wildcat Construction Co. Scholarship in 2002.

Jason Eichenberger, Ottawa, junior in CE, received the outstanding undergraduate student award for the year 2002.

Walter Blesser (BSCE '02) and Cameron McGown (BSCE '02) were recipients of the 2002 Kansas ASCE Section Outstanding Senior Awards for the spring and fall semesters, respectively.

Charkas Hasan (MSCE '02) received the 2002 Sanjay Gattani Outstanding MS Student Award. Wei Jin received the Sanjay Gattani Outstanding Ph.D. Student Award for the second year in a row (2001 and 2002).

Sathyanarayanan "Sathya" Sudhakar (MSCE '02) received the Council of University Transportation Centers' (CUTC) Award for the top non-thesis master's report in the nation in the area of transportation for the year 2002.

Faculty achievements

Lakshmi Reddi, prof., was the recipient of KSU College of Engineering's Research Excellence Award for the year 2001–2002, and the 2002 Chi Epsilon Advising Excellence Award. Reddi is also a member of the editorial boards of the *Journal of Hazardous Materials* and ASCE's *Journal of Geotechnical and Geoenvironmental Engineering*.

Robert Stokes, prof., received the 2002 CE Outstanding Colleague Award and 2002 CE Outstanding Professional Service Award for his contributions to the department, university, and professional societies. At the national level, Stokes served as chair of ASCE's Committee on Student Activities in 2002.

Hayder Rasheed, asst. prof., received the 2002 CE Outstanding Teaching Award for teaching activities and accomplishments in the department. Rasheed is also a member of the editorial board of the *International Journal of Structural Stability and Dynamics*.

Alok Bhandari, asst. prof., received the 2002 CE Outstanding Research Award and the 2002 Chi Epsilon Teaching Excellence Award. Bhandari is also a member of the editorial board of ASCE's *Practice Periodical of Hazardous, Toxic, and Radioactive Waste Management*.

Mustaque Hossain, prof., received the 2002 CE Outstanding Graduate Faculty Award for mentoring and advising graduate students. Hossain was promoted to full professor in 2002

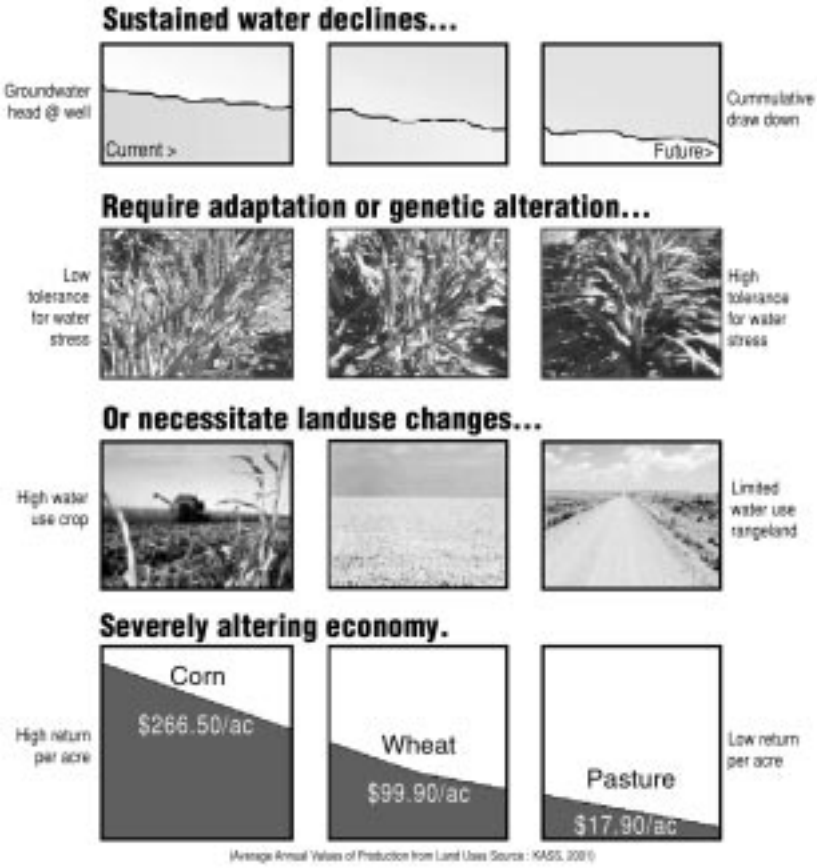
Steven Starrett was promoted to associate professor with tenure in 2002.

Research launched on groundwater-based economies

Declines in groundwater elevation pose risks to economic, social, and environmental well being of the region overlying the High Plains Aquifer. It is of national and international interest to identify and evaluate economically viable, socially acceptable, and environmentally conscious groundwater management strategies to sustain this important region.

The Consortium for International Research on Groundwater-Based Economies (RoGBE) was formed to assist development of such strategies. RoGBE is coordinated by David Steward, asst. prof., and collects an interdisciplinary team of researchers who seek to create and disseminate knowledge related to the adaptation to limited water resources, with the shared vision: "To help citizens, planning agencies, and policy makers understand both the technical aspects of aquifer management and the economic, social, and natural system impacts of groundwater management strategies."

Team members are collaborating on four inter-related tasks: (1) identifying stakeholders and facilitating their input into the design of groundwater management strategies; (2) developing a common geodatabase that assembles hydrologic, environmental, economic, and socio-demographic data collected at multiple geographic scales; (3) analyzing current and projected trends in groundwater use and the possible impacts of different groundwater management strategies on environmental, economic, and social systems; and, (4) creating education materials that utilize the newest information technologies as well as other forms of communicating information on groundwater use in the region, and strategies designed to manage this important resource.



Interdisciplinary, inter-related processes of hydrology, economics, and natural and social systems.

CE grad named 2003 Alumni Fellow

Alan Sylvester (BSCE '75), vice president (Lubricants Division), Citgo Corp., visited campus and the CE department as the College of Engineering's Alumni Fellow for 2003.

NSF funds geo-environmental engineering

CE has taken the lead in developing a curriculum in geoenvironmental engineering at KSU by partnering with faculty from chemical engineering, and biological and agricultural engineering. Alok Bhandari, asst. prof., Lakshmi Reddi, prof., and David Steward, asst. prof., are working with Larry Erickson of chemical engineering and Stacy Lewis-Hutchinson (MSCE '96, PhDCE '98) of biological and agricultural engineering on a National Science Foundation-funded, Combined-Research-and-Curriculum Development (CRCD) project.

This project, approved for a total funding of $410,000, focuses on development of three courses—Design of Groundwater Flow Systems (to be coordinated by Steward), Principles of Geoenvironmental Engineering (to be coordinated by Reddi), and Geoenvironmental Design (to be coordinated by Bhandari, Erickson, Lewis-Hutchinson, and Reddi). The first two courses will be designed to provide the necessary foundation to enable students to undertake real-life design of waste-containment and site-remediation systems.

Specific objectives of curriculum development include the synthesis of relevant principles and themes; incorporation of evolving research on subsurface fate and transport processes, site remediation, and waste-containment methods; and experiential learning in interdisciplinary design teams. The project is expected to lead to establishment of a minor program for undergraduates and a certificate program for graduate students.

Key features of the NSF-CRCD project are the potential of student interactions with a consortium of university and industry experts, and access to the vast repository of knowledge housed at KSU's Great Plains and Rocky Mountain Hazardous Substance Research Center, and Purdue University's Midwest Hazardous Substance Center.

Fall retreat precedes back-to-school activities

CE faculty and staff take a break from their August retreat at Manhattan Holiday Inn-Holidome. Bottom L to R: Hani Melhem, Yacoub Najjar, and Lakshmi Reddi. Top L to R: Angie Fairbanks, Steve Starrett, Danita Deters, Robert Stokes, Dunja Peric, Asad Esmaeily, Alok Bhandari, Robert Peterman, Peggy Selvidge, Sunanda Dissanayake, and David Steward

Testing abounds at Civil Infrastructure Systems Laboratory

Every six seconds, a full-size truck axle rolls silently over the pavements constructed at CISL, the Civil Infrastructure Systems Laboratory at Kansas State University. The laboratory houses the first full-scale accelerated pavement test (APT) program in Kansas. The research program is well established, and each year, state highway representatives from four Midwestern states, together with KSU professors, select the topic of a new project. For each experiment, four full-scale pavements are constructed in two ten-foot deep pits, using conventional construction methods.

After construction is finished, the pavements are loaded until they fail by a full-size truck axle pulled by a motor connected to a 40-foot-long steel frame. Longitudinal and transverse profiles, cracking, and stresses and strains in the test roads are recorded.

The advantage of the APT experiments is that twenty years of cumulative truck traffic can be applied to the tested pavements in only a few months. This allows quick evaluation of new materials and construction methods. The facility at Kansas State University is the only one in the country entirely owned and operated by a university.

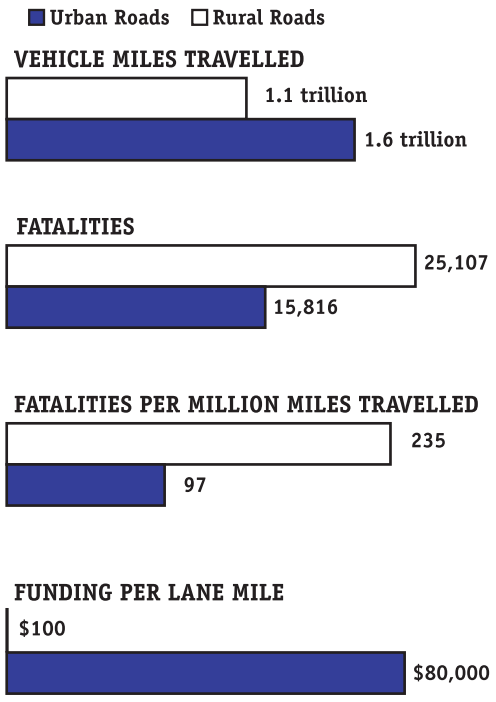
CE faculty Stefan Romanoschi, asst. prof., and Mustaque Hossain, prof., are currently developing a project to compare the structural contribution of soil-treated embankments when mixed with lime, fly-ash, cement, or an organic additive. Pavements containing a three-inch asphalt concrete surface layer will be subjected to more than half a million passes of the 34,000-lb. dual axle. Results from this project will allow highway engineers in four Midwestern states to select the optimum chemical for use in embankment soil stabilization.

CE focuses on rural transportation infrastructure issues

Transportation infrastructure is an essential component of a nation's economy. Highways constitute a key element of this infrastructure and are responsible for 90% of all passenger travel and more than 50% of the nation's freight tonnage. The U.S. Highway system consists of approximately four million miles of roadway, more than half a million bridges, and an asset value of more than $1,300 billion. Approximately three million miles of roadway are under rural jurisdictions, with Kansas alone accounting for about 80,000 miles of rural roads.

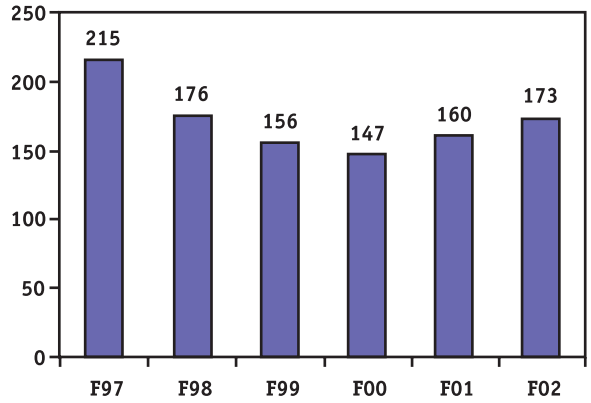
KSU recently established the National Research Center for Rural Transportation Infrastructure (NRCRTI)—a research program focusing on investigating new approaches for cost-effective preservation and management, and safe operation of rural transportation infrastructure. Projects are supported by the United States Department of Transportation (USDOT), state DOTs, and other land-grant universities. The Kansas Department of Transportation (KDOT) has pledged up to $450,000 of matching support per year. This initial network will be further expanded, on a competitive basis, to include researchers from other institutions and private partners in Kansas and other states.

As a part of this initiative, KSU has requested $1 million per year for six years from the next federal appropriation for highway transportation. The center's activities will complement ongoing University Transportation Center (UTC) programs of the USDOT, and will provide new and innovative ways to preserve our rural transportation infrastructure, including the safety of agricultural commodity movement vital to Kansas' economy.



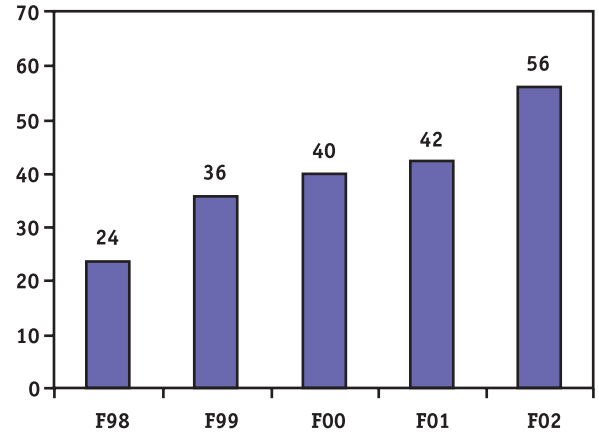
Enrollment, research dollars on the grow

Fall Undergraduate Enrollment



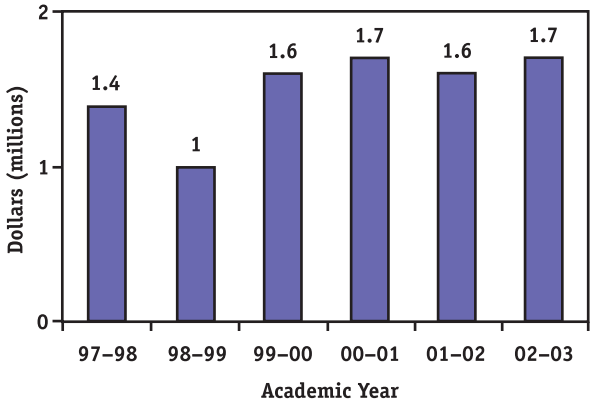
After a drop to 147 in fall '00, our undergraduate enrollment has shown a steady increase.

Graduate (MS & PhD) Enrollment



Our graduate enrollment also has shown a steady increase. Our distance education program is showing a similar trend.

CE Extramural Expenditures



Our research expenditures have been steady at $1.6 to $1.7 million per year ($115 per faculty member), on average.

CE mission and educational objectives

Mission statement

The mission of the civil engineering department at Kansas State University is to provide

- excellence in classroom instruction and an educational environment that prepares our students for professional careers in civil engineering;
- enrichment of the academic and professional experience of students and faculty;
- outreach to the engineering community; and
- advancements in civil infrastructure development and preservation.

Educational objectives

CE graduates will become

- technically competent for civil engineering practice;
- knowledgeable of the natural and social context of engineering practice;
- critical thinkers and effective communicators; and
- engineers with high standards of professional ethics.

CE educational objectives were reviewed by the student body, the faculty, and the advisory council. We believe these objectives succinctly and most effectively describe our educational goals.

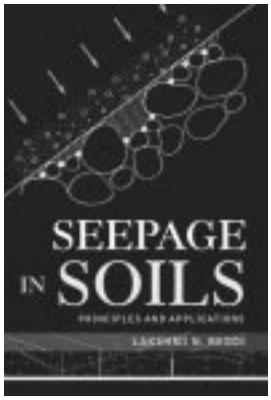
Retirement announced

Russell Gillespie, research technologist, announced his retirement after 33 years of service at KSU.

Reddi authors textbook

Seepage in Soils, written by CE department head Lakshmi Reddi and published by John Wiley and Sons, Inc., combines a broad range of applications with rigorous quantitative skills to give insight into the fundamental principles and mathematical solutions of seepage.

A wealth of closed-form analytical solutions are provided to solve a variety of problems in a way that minimizes the use of computer software and numerical models. Up to date with coverage of new developments in separators, filters, and geosynthetics, this textbook includes exercises in seepage quantification, seepage forces, dewatering, and solid waste leachate management.



Lakshmi Reddi, CE prof. and dept. head, is the author of the recently published textbook, Seepage in Soils.

Only a nominal background in mathematics and soil mechanics is required to follow this textbook. Designed for usage in senior-level and first-year, graduate-level instruction, *Seepage in Soils* serves as an invaluable resource for civil engineering students across many subdisciplines within civil engineering. It will also be a valuable reference for geotechnical, environmental, and structural engineers; hydrologists, geologists, agronomists, and soil scientists.

Division of Continuing Education

13 College Court Building
Manhattan, KS 66506-6001

E-mail: info@dce.ksu.edu

Phone: 1-877-528-6105

Web: www.dce.ksu.edu/dce/distance/

Distance graduate courses

Fall 2003 CE courses:
CE 732 Advanced Structural Analysis
CE 751 Hydraulics of Open Channels
CE 766 Wastewater Engineering
CE 774 Pavement Design
CE 775 Traffic Engineering I
CE 790 Portland Cement Concrete Pavements
CE 825 Environmental Geotechnology

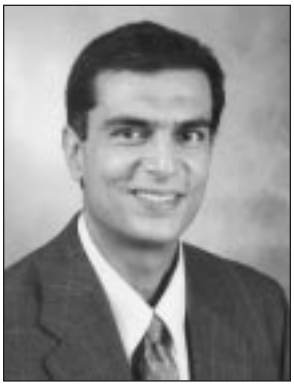
Spring 2004 CE courses:
CE 680 Economics of Design and Construction
CE 752 Advanced Hydrology
CE 762 Water Treatment Processes
CE 773 Hot Mix Asphalt Mix Design & Const
CE 822 Shear Strength & Slope Stability of Soils
CE 833 Advanced Structural Analysis II
CE 857 Advanced CE Design Using GIS

New faculty appointments

Sunanda Dissanayake, asst. prof., joined the CE dept. in 2002 as a faculty member in the transportation area.

Sunanda Dissanayake, asst. prof., joined the CE faculty during the fall 2002 semester. She received her Ph.D. from the University of South Florida (1999) and worked there as a research assistant professor before coming to K-State. Her research interests include various aspects of traffic engineering, highway safety, and access management. She moved to Manhattan with her husband, Gamage, and their daughter, Gihani, 8.

Asad Esmaeily, asst. prof., joined the CE faculty in fall 2002. He received his Ph.D. from the University of Southern California in 2001 and worked for the California Department of Transportation before coming to KSU. Esmaeily has M.S. degrees in structural engineering and electrical engineering from USC, and B.S. and M.S. degrees in civil engineering from Tehran University, Iran. His research interests include seismic analysis and design of structures, analytical models and methods in structural engineering, performance-based design, and structural control. Esmaeily moved to Manhattan from California with his wife, Shokouh, and his son, Amir, 6.



Asad Esmaiely, asst. prof., joined the CE dept. in 2002 as a faculty member in the structures area.

Alumni recognitions

Robert Tointon (BSCE '55), Phelps-Tointon, Inc., was inducted into the Colorado Business Hall of Fame in February 2003. The Tointon Family Baseball Stadium at KSU was dedicated in April 2002.

Arland Hicks (BSCE '54), KDOT, received the Special Recognition Award from the Kansas Society of Professional Engineers (KSPE).

Larry Emig, (BSCE '66, MSCE '82), KDOT, was named Engineer of the Year by KSPE.

Randall R. Coonrod, (BSCE '74), Coonrod and Assoc. Construction Co., Inc., was inducted into the 2002 College of Engineering Hall of Fame.

Alan Sylvester (BSCE '75), Citgo Corp., was named the KSU Engineering Alumni Fellow for 2003.

Kerry Moore, (BSCE '85), HDR Engineering, Inc., received the KSU College of Engineering's Professional Progress Award in 2002.

Dianne (Linder) Honomichl (BSCE '86), Black & Veatch, Inc., and Kevin Honomichl (BSCE '86), Brungardt & Honomichl, became the first couple, and for Dianne, the first woman, to be recognized by the KSU College of Engineering through its 2002 Distinguished Service Award.

Keith Beatty, (BSCE '97), City of Emporia, was named the Outstanding Intern Engineer of the Year by KSPE.

Partnership with K-State CE

Please support the K-State CE department through your financial contributions and/or suggestions/recommendations on our curricular and extracurricular activities.

_____
Name

_____
Year of Graduation P.E. Yes No

I would like to contribute to the following activities within the department:

❑ Student and faculty professional development
❑ Outreach activities of the department
❑ Concrete canoe/steel bridge, other activities
❑ No preference

Enclosed please find a check to the KSU Deptartment of Civil Engineering in the amount of:

❑ $100

❑ $200

❑ $300

❑ other $ _____

Please mail your comments and/or contribution to the Department of Civil Engineering, Kansas State University, 2118 Fiedler Hall, Manhattan, KS 66506-5000.

CE Professional Academy

Corporate Members:

KS Asphalt Pavement Assoc., Inc.
Brungardt Honomichl & Co., P.A.
HDR Engineering, Inc.
CAS Construction, Inc.
Kansas Structural Composites
Wilson & Co.
South Central Cement Promotion Assoc.
Wildcat Construction Co., Inc.

Individual Members:

Wilbur Laird
James Tadtman
Warren Wray
Charles May, Sr.
Philip Frazier
Donald Broyles
Byron Freeby
Jeffrey Lessman
Kerry Moore
Les Doty
Max DaMetz
Walter Hanson
Robert Thorn

29100-3/03-2M

Kansas State University
Department of Civil Engineering

2118 Fiedler Hall
Manhattan, KS 66506-5000
437

Phone: (785) 532-5862
Fax: (785) 532-7717
www.engg.ksu.edu/CEDEPT/