

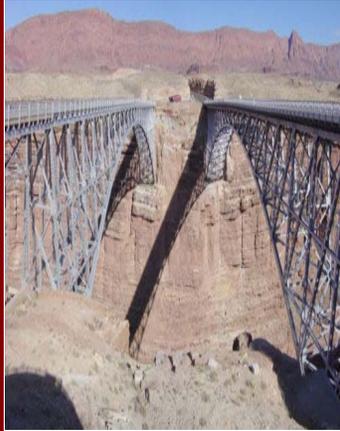
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Quote

The engineer is the key figure in the material progress of the world. It is his engineering that makes a reality of the potential value of science by translating scientific knowledge into tools, resources, energy and labor to bring them into the service of man ... To make contributions of this kind the engineer requires the imagination to visualize the needs of society and to appreciate what is possible as well as the technological and broad social age understanding to bring his vision to reality.

Sir Eric Ashby



THE BRIDGE

*Newsletter for
Students of
Civil and Environmental Engineering
UMASS - AMHERST
September 2006*

Transportation Engineering Mentoring Program

The Transportation Engineering Applied Academics Mentoring (TEAAM) program will be launched in September. The TEAAM program consists of four components, all aimed at helping students identify how to meet their academic requirements while simultaneously using the resources available to them to understand career options and develop skills that will make them strong candidates for employment in transportation engineering following graduation.

The four components of this program are:

- Individual mentoring for graduate students by faculty and staff mentors;
- Mentoring provided by graduate students for undergraduates;
- Career and skills development seminars;
- Drop-in hours to get assistance and advice from faculty and staff.

The TEAAM program received a grant from the UMass Graduate School as part of its Grants for Graduate Mentoring program. TEAAM is being developed and implemented by the UMass Student Chapter of the Institute of Transportation Engineers (ITE) and the UMass Traffic Safety Research (UMassSAFE) Program under the guidance of Dr. Michael Knodler and in conjunction with the Department of Civil and Environmental Engineering. For more information email hrothenb@acad.umass.edu or visit www.ecs.umass.edu/umasssafe/teaaam.htm.

CEE Information

Schedule Announcements for Fall 2006

CEE 290A has been changed to CEE 260.

CEE 296 Please see Dr. Chajes in 232 Marston Hall to arrange a lab time.

CEE 370 will be taught by Dr. Reckhow.

CEE 396 with Dr. Ostendorf; the lab time is Monday from 1:25-4:25 pm in 10 Marston Hall.

CEE 396 with Dr. Highter; please see Dr. Highter in 38 Marston Hall to arrange a lab time.

CEE 496A has been changed to CEE 418.

CEE 511 has been added and will be taught by Jon Dietrich.

CEE 590B has been cancelled.

CEE 630 will be taught by Dr. Arwade.

CEE 646 will be taught by Dr. Brena.

Save the Date

9/19: Add/drop deadline

9/21: Feng Lecture

10/10: Holiday

10/11: College of Engineering Career Fair at the Campus Center Auditorium

10/11: Monday class schedule

10/17: Last day to 'DR' drop - Graduate

10/21: Homecoming

10/21: College of Engineering Open House

10/25: CEE Career Fair in the Guinness Student Center

10/31: Last day 'W' drop period - Undergraduate

11/8: Pre-Registration Advising Night from 4-7 p.m. in the Guinness Student Center

December Graduates

If you plan to graduate at the end of this semester, please review your Degree Audit on SPIRE to be sure that all College and University requirements have been satisfied. If you have any questions or problems, please contact Jodi Ozdarski in 226 Marston or Dr. Lardner in 234A Marston.

Spring 2007 Pre-Registration Advising

Spring 2007 pre-registration advising for CEE majors and ENGIN students will be held on **Wednesday, November 8 from 4:00-7:00 pm in the Guinness Engineering Student Center**. Pizza and soda will be served. Additional details will be available in the next issue of THE BRIDGE.

Spring 2007 Electives

Below is a tentative list of electives that will be offered in the spring '07 semester. As you plan for next semester, please keep in mind that you must include 2.5 credits of Engineering Science and 3.5 credits of Engineering Design components. Additionally, your choice of electives must include at least one Transportation and one Geotechnical Engineering course.

- CEE 275 Introduction to AutoCAD
- CEE 423 Engineering Geology (4 cr)
- CEE 433 Concrete Design
- CEE 450 Hgwy Loc & Design
- CEE 462 Water Resources
- CEE 490A Sustainable Aspects of CE
- CEE 509 Transportation Sys. Analysis
- CEE 516 Trans. Design
- CEE 541 Structural Dynamics
- CEE 561 Open Channel Flow
- CEE 577 Surface Water Quality Modeling
- CEE 590B Bridge Design
- CEE 590Q Earthquake Engineering

Fundamentals of Engineering Exam (EIT)

For information about the FE exam, you may access the Professional Credential Services, Inc. website at www.pcshq.com. The spring exam is **scheduled for April 21, 2007** with an application deadline of March 1, 2007. You may download applicant information and applications on-line, or you may telephone 1-877-ENG-EXAM.

Undergrad Student Handbooks

are available on line at
http://www.ecs.umass.edu/cee/cee_web/acad_undergrad.htm

CEE Research Projects

VTrans Research Project

Submitted by Andy Jeffrey

As part of an ongoing research project sponsored by the Vermont Agency of Transportation (VTrans), the Structural Engineering and Mechanics group recently



conducted a non-destructive live-load test of a 1920's reinforced concrete bridge in Royalton, Vermont. Strains were monitored



at different locations on concrete girders as a loaded truck crossed the bridge at slow speed. The research team led by Andy Jeffrey (MS student), Dr. Breña (PI), and Dr. Civjan (co-PI) plan to gain a better understanding on the behavior of these bridges and provide VTrans with a practical tool for load rating and granting load permits. Other graduate and undergraduate students that participated in the recent test include Mike Mitchell, Linwood Gallant, and Vladimir Cáceres. The next bridge test, currently planned for September will be conducted on a steel girder bridge supporting concrete decking.

Acid Mine Drainage in the U.K.

Submitted by Christina Stauber

At UMass Amherst, an interdisciplinary research group is currently tackling Acid Mine Drainage (AMD), a worldwide problem that occurs at abandoned mines where pyrite is present. The project is headed up by Dr. Yuretich. I have been given amazing opportunity to work on a small part of this project as my Commonwealth College Independent Capstone while studying abroad in the U.K. I work under the guidance of Dr. Ergas, and have also aided in with research under Erika Lopez Luna (PhD candidate).

Acid mine drainage occurs at abandoned mines characterized by pyrite rich sediments. As water that would normally be pumped out rises through the old mine workings and shafts, the water and oxygen allows pyrite (iron sulfide) to be oxidized, releasing sulfuric acid, iron, and other metals into the water. The result is a stream characterized by an orange color and a low pH that is often unable to sustain life.

The fascinating thing about this problem is the diversity of microbial activity that occurs at these polluted sites. The microbial activity can actually reverse the oxidation process, remediating the situation naturally. This natural remediation has been observed at the Davis Mine in Rowe, Massachusetts, the home site of the UMass group.

Sulfate and iron reducing bacteria have been identified as key players in the natural attenuation of AMD. One of the tools being used to study microbial remediation is microcosm studies. Small bottles are filled with sediment and water from an AMD site, and a carbon source is added to observe changes in microbial activity. This method has been used to study the natural attenuation occurring at Davis Mine, and is now being used to observe the microbial behavior at Parys Mine, a much larger AMD site located in Anglesey, Wales. I am observing the effects of adding carbon sources to the sediments at Parys Mine by conducting a microcosm study at the University of Manchester in England, under Dr. Lloyd.

Contact Us

nofio@ecs.umass.edu

Adding carbon sources to the microcosm bottles is showing promising results; by adding local materials like algal mass or wood chips to the bottles, it appears that the previously inactive microbes may be able to begin to reduce iron and sulfate efficiently. This can be observed by a rise in pH and a drop in redox potential in the bottles, along with iron analysis. For the rest of the year I will continue monitoring the bottles to test this hypothesis. Further microbial analysis may also be done on identifying the responsible microbes.

Making Engineering Relevant to School Kids

This summer and fall the Civil and Environmental Engineering Department at UMass Amherst is conducting a course entitled "Civil & Environmental Engineering in Our World" for 25 elementary-, middle-, and high-school teachers from Springfield and Holyoke. The purpose of the course, created by UMass Amherst at the request of Erlene Provoste, the science director for the Springfield Schools, is to orient school teachers to engineering concepts that they can later introduce to their own classes.

One highlight of the course is a tour of the Human Performance Laboratory with its state-of-the-art driving simulator. The three-credit graduate course is designed to enable teachers to deepen their knowledge of science and engineering concepts and develop hands-on classroom activities related to the Massachusetts Engineering/Technology curriculum frameworks. It includes the following areas of focus: engineering design and systems; the structure of bridges; water quality; transportation safety; and construction materials, methods and technologies. Four faculty members from the Civil and Environmental Engineering Department are teaching the course: **Dr. Lutenegger, Dr. Brena, Dr. Ergas and Dr. Knodler.** Mr. Chris Emery, an adjunct lecturer in the UMass Amherst School of Education, is also teaching.

Independent Study

Dr. Lutenegger is looking for two students who are interested in an Independent Study for 396. The possible projects include "Integrity of Wood Plies from Boston", "Influence of Particle Shape on Minimum and Maximum Density of Sands" and "Thermal Conductivity of Clay Minerals". If you are interested in this opportunity please contact Dr. Lutenegger at lutenegg@ecs.umass.edu.

Spring 2006 Dean's List

Nicole Baldvins, Daniel Bearse, Kane Bennett, Andrew Berthaume, Patrick Boggs, Lukas Bradley, Colleen Carrigan, Kuok Chiang, Jesse Conklin, Matthew Doyon, Daniel Gnatek, William Goulet, Samuel Gregorio, Erica Guidoboni, Yonah Halpern, Brian Harris, Robert House, Ryan James, Elena Janice, Joseph Kenney, Michael Kuchieski, Yeshar Larsen, Jun Li, Stephanie Maker, Patrick Malone, Luke Matton, David Maynard, Anna Mermelstein, Stacy Metzger, Michael Mitchell, Jesse Morgan, Kevin Moriarty, Michael Nelson, Jill Russell, Christopher Sanford, Ryan Siegel, Christina Stauber, Dawid Szymczakiewicz, Melissa Trombley, Steven Tupper, and Kaiyin Yip.

CONGRATULATIONS!

Faculty News

Message from Dr. Lutenegger

For the past six years, it has been my pleasure to serve as Head of the CEE Department. Last year I decided that I wanted to return to full time teaching and research, and develop a number of engineering outreach activities focusing on the areas of Geotechnical Engineering and engineering history. On July 31, 2006 I returned to the faculty and leave the administration of the Department to others. I feel a great sense of accomplishment for the many initiatives that we have undertaken in the past six years and I feel very good about the current state of our Department. We have some very good people who are dedicated to our mission and have a passion for their work. Students, faculty, and staff should all be proud of these accomplishments and future of the Department.

Message from Dr. Collura, Interim Department Head

As we await the arrival of our new Department Head, Dr. Anant Kukreti, the CEE faculty and staff look toward the 2006-2007 academic year with both excitement and enthusiasm. This fall the Department will consist of more than 250 undergraduate students, a substantial increase from the previous two years in which these totals were 184 (2004) and 217 (2005). We are also proud to note that the Department has several very active and award winning student chapters associated with nationally established professional organizations including the American Society of Civil Engineers (ASCE), the Institute of Transportation Engineers (ITE), the Association of General Contractors (AGC), and Engineers without Borders (EWB). These chapters provide a unique and important experience to all our students to be involved. Finally, we wish former Department Head, Dr. Lutenegger, the best of luck as he returns to the Department's Geotechnical group. His six years as Head were extremely productive and well appreciated and we look forward to his continuing contributions in teaching and research.

After 22 years of service to the Department, **Dr. Edzwald** has retired from UMass. Many students will remember his dedication to teaching and we all wish him a happy retirement!

This past spring **Dr. Knodler** was awarded the CEE Advisory Council Faculty Award for his contributions to the Department. Congratulations Dr. Knodler.

Dr. Arwade joined the CEE faculty as an Assistant Professor in the Structural Engineering group. He taught for several years at Johns Hopkins and earned his Ph.D. at Cornell University and his B.S. at Princeton. Welcome Dr. Arwade to UMass!

Dr. Long has accepted a position as Director of Environmental Microbiology for the Wisconsin State Laboratory! We will miss her and wish her all the best!

News from Student Engineering Groups

ASCE (American Society of Civil Engineers)

Faculty Advisors: Dr. Brena & Dr. Civjan

President: Matt Skelly and Vice President: Elsbeth Hearn

ASCE First Chapter meeting is on Wednesday, September 20th at 6 pm in Elab II Auditorium. If you cannot attend the first meeting please join us for one of the following meetings which will all be in Marston 132 at 6:00 pm. Thursday, October 12th; Thursday, November 2nd; Thursday, December 7th.

EWB (Engineers Without Borders)

Faculty Advisors: Dr. Ahlfeld and Dr. Tobiason

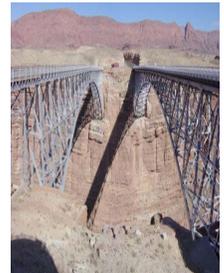
President: Tom Chase and Vice President: Julie Gagen

The student chapter of Engineers Without Borders is entering its first official academic year! Over the summer the Kenya Project Team began drafting design alternatives to be implemented as soon as January 2007. The ReVision House Team has completed Phase I and is hoping to revive the project this coming fall. The Lena Park Project is currently working on a partnership with a Boston based company which will assist in developing a wind turbine for the housing development in Dorchester, MA. All students are encouraged to attend the first meeting of the semester, as the group will be reorganizing in an effort to become more efficient with all of the projects that are received.

EWB First Chapter meeting is on Tuesday, September 19th at 6 pm in Elab II Auditorium. If you cannot attend the first meeting please join us for one of the following meetings which will all be in Marston 211 at 6:00 pm. Tuesday, October 24th; Tuesday, November 14th; Tuesday, December 5th.

Locate and Name This Bridge!

This bridge crosses the Colorado River. Construction of the original bridge began in 1927, and the bridge opened to traffic in 1929. The bridge is 834 feet in length, with a maximum height of 467 feet from the canyon floor. Its roadway offers an 18 foot surface width with a load capacity of 22.5 tons (although the posted legal weight limit was 40 tons). During the design phase, a wider roadway was considered, but ultimately rejected, as it would have required a costly third arch to be added to the design, and the vehicles of the time did not necessitate the wider road.



In 1990, however, it was decided that the current traffic flow was too great for the original bridge, and that a new solution was needed. The sharp corners in the roadway on each side of the bridge's approach had become a safety hazard due to low visibility, and the deficiency in the original design's width and load capacity specifications were becoming problematic. The bridge had also become part of the US Federal Highway System's Route 89ALT, and it did not meet the required standards of such a road. The original proposal called for merely widening and fortifying the bridge, but



this was ultimately rejected since this could not possibly bring it up to current federal highway standards. Replacement was then the only option, and it was eventually decided to entirely discontinue automobile use of the original bridge. A new bridge would be built immediately next to the original and have a considerably similar visual appearance, but would conform to modern highway codes. The new bridge was completed in September of 1995, at a cost of approximately \$15 million dollars. The original bridge is still open to pedestrian and equestrian use, and an interpretive center has been constructed nearby to showcase the historical nature of the bridge and early crossing of the Colorado River.

Email your answer with the location and name of this bridge to nofio@ecs.umass.edu and correct entries will be eligible to win a prize! The winner will be drawn on October 2, 2006!