



The Alumni Newsletter of the Civil and Environmental Engineering Department
Brigham Young University - Summer 2002

Department Chair's Message

Again we greet you from the CE En Department at BYU. We are excited about beginning another new academic year with both returning and new students. Our enrollment remains approximately the same with about 90 students in each class and about 70 graduate students.

Our students are of outstanding quality and it is a pleasure to associate with them. The student chapter, under the leadership of Dr. Brett Borup, again won the Zone 4 Vice Presidents Award and was a finalist for the Ridgeway Award.

Our outstanding faculty are also doing very well. We truly enjoy working together. Each faculty member contributes significantly in his own way to the success of the students and to the achievement of department goals and objectives. We have added a new member to our faculty in our transportation group. Spencer Guthrie will join us this fall after graduating from Texas A & M University with a PhD in pavement materials engineering. We look forward to his contribution to our department in teaching, mentoring and scholarly activities. (See page 4 to learn more about Spencer.)

We feel like we are well prepared for our ABET accreditation visit on October 28-29. We will let you know of the outcome. Thanks to Dr. Norm Jones and the faculty undergraduate



Dr. Woodruff Miller

committee, hundreds of pages of documentation, assessment and progress reports have been compiled. We have course evaluations, exam results, home work and lab work, exit interviews, alumni feedback and student notes, all related to our department attributes and competencies. We expect to be re-accredited.

This news letter contains articles highlighting outstanding and acclaimed research being conducted by faculty and students at BYU CEEn. The faculty have been able to involve not only graduate students, but also undergraduate students in their creative activities. This adds another dimension to their Bachelors Degree and makes their senior level courses more meaningful and appreciated. We are pleased with the notoriety which the department has gained from the university, the local community, and the national and international engineering community. The acclaim has been because the work is in applied

research and is of high quality and usefulness.

We are grateful to our alumni for your many contributions in many different ways. Several of you have spoken at the undergraduate and graduate seminars this past year. Others of you have helped with our outstanding student chapter activities and projects. Some of you have helped our graduating students with information on job opportunities, recruitment, and economic conditions, and even hired some of our graduates. And many, many of you have contributed financially to our scholarship fund. Thank You!! The unique matching program from last year has been extended for another year. Last year with the matching money we received over \$200,000 for student scholarships, \$13,000 of that was from our own student contributions.

Last year was another good year for the CE En Dept. We appreciate your interest and support. Let us know about yourselves and we will pass that along in the next news letter alumni updates. We hope to see many of you again at our annual fish fry this year on October 18th at BYU's Homecoming (see page 9 for details).

May this coming year be enjoyable and successful both professionally and personally.

Sincerely,
Wood Miller

Program under Review for ABET Accreditation

Every six years the CE program undergoes a thorough review by the Accreditation Board for Engineering and Technology (ABET). Our program is currently being reviewed. We have submitted a 300+ page self-study report to ABET and an evaluation team will visit BYU in October. If we pass this review, our program is “accredited” for the next six years. Accreditation is vital since a degree from a non-accredited institution is almost worthless. For example, to get a P.E. license, one must have a degree from an accredited program. Therefore, we take this review very seriously.

In the past, the criteria used by ABET to review engineering programs changed little for many years. The old criteria were quite prescriptive in nature, detailing how many credit hours should be offered in each subject and what features should be included in the curriculum. In recent years, ABET has completely overhauled the criteria used to review programs. The new guidelines are called the “ABET 2000” criteria. We have been overhauling our program to satisfy the new criteria for the past several years.

Under the new system, each program is required to implement an outcomes-based curriculum strategy. The first



step in this approach is to develop a set of broad educational objectives. We have developed the following three objectives:

A. Provide our students with a broad-based educational experience including an exposure to the liberal arts and a strong foundation in basic math and science.

B. Maintain a strong program built around four fundamental civil engineering disciplines: water and environmental engineering, geotechnical engineering, transportation engineering, and structural engineering.

C. Develop civil engineering graduates with integrity and a commitment to the gospel of Jesus Christ and who are prepared for life-long service to community, church, and profession.

Once the objectives are defined, the next step is to develop a set of outcomes associated with the objectives. We have defined our outcomes in terms of a set of specific “attributes” we wish to develop in our students by the time they graduate from our undergraduate program. These attributes are as follows:

1. An understanding of fundamental principles of mathematics and science
2. An understanding of fundamental engineering science
3. An understanding of geotechnical engineering
4. An understanding of structural engineering
5. An understanding of transportation engineering
6. An understanding of water resources and environmental engineering
7. The ability to design civil engineering systems and solve open-ended problems
8. The ability to communicate ideas effectively
9. The ability to use modern engineering tools
10. An understanding of professional practice and a commitment to life-long learning.
11. An awareness of cultural, societal, and environmental issues
12. A commitment to serve as professional engineers of integrity and faith

Program under Review for ABET Accreditation Cont.

For each of these attributes, we have also defined a list of specific competencies we wish to develop in the students. A complete list of the attributes and competencies can be found at:

<http://www.et.byu.edu/ce/ceweb/objectives/objectives.htm>

After formulating the objectives and outcomes, we reviewed the curriculum and made modifications where necessary to ensure that it is designed to satisfy the objectives and achieve the outcomes.

Finally, we developed a comprehensive assessment strategy to gauge our success in achieving the program outcomes. This strategy consists of the following tools:

1. **Competency Tracking on Exams.** Student performance with respect to specific outcomes are measured according to performance on midterm and final exams. Results are entered into a database and performance is evaluated on a section by section basis.
2. **Fundamentals of Engineering Exam.** Student performance relative to peers from other U.S. institutions is gauged using the Fundamentals of Engineering Exam.
3. **Exit Interviews.** Each graduating student is given

a questionnaire to fill out. The students are asked to give us feedback in terms of how successful the program was in terms of achieving the program outcomes. Students are also asked to provide feedback on the appropriateness of the program objectives.

4. **Alumni Surveys.** Department alumni are polled and asked the same questions we ask our graduating students.
5. **Annual External Review.** Each fall we host a visit from an external review board made up of industry leaders, most of whom are alumni of our program. The board is asked to review our program objectives and assessment strategy.
6. **Student Evaluations.** At the conclusion of each semester, students are asked to rate how effective each section was in terms of achieving the outcomes. The students are also invited to rate the appropriateness of the program objectives and outcomes.

7. Department/College/University Review. The department faculty fill the primary role in the development of the program objectives. The objectives and assessment strategy are continuously reviewed by the department faculty, and the college and university administration.

The objectives, outcomes, and assessment strategy form a feedback loop. We have been using the assessment tools to gather data for two years now. When we note weaknesses, we make an appropriate set of changes to the program. As an example of the type of data we are collecting, the following table illustrates the percentage of our students passing the FE exam vs. the national average (See table below).

As can be seen, our students perform much better than the national average. We have observed similar results for each of the subject areas covered on the FE exam. Overall, our assessment process has shown that we are achieving our desired outcomes and that our students are well-prepared for a career in civil engineering.

	Oct. 1999		April 2000		Oct. 2000		April 2001		Oct. 2001	
	BYU	Nat'l	BYU	Nat'l	BYU	Nat'l	BYU	Nat'l	BYU	Nat'l
# Examinees Taking	40	2410	23	3224	28	1587	29	2337	53	2789
# Examinees Passing	40	1645	21	2104	27	1286	28	1801	49	1910
% Examinees Passing	100%	68%	91%	65%	96%	81%	97%	77%	93%	67%

Spencer Guthrie to join Faculty

This fall Spencer Guthrie will be joining the civil and environmental engineering faculty at Brigham Young University. Spencer received his elementary and junior high school education in Corpus Christi, Texas, before his family relocated to Smithfield, Utah, just prior to his beginning high school. He is the oldest of ten children, and his only brother, who is the youngest, was born the month before Spencer departed home to serve as a full-time missionary in the California San Diego Mission among the Cambodian people.

Spencer pursued his bachelor of science in civil and environmental engineering at Utah State University, where he met his wife Nancy in a physics class during the course of her studies toward a degree in mathematics. Following her missionary service in the Mascarene Islands, then part of the South Africa Durban Mission, Spencer and Nancy were married in the Logan Temple.

At USU, Spencer served in numerous student leadership positions, including president of the American Society of Civil Engineers student chapter, and he was the first civil and environmental engineering student to graduate with both university and departmental honors. For his achievements at the university and within the



Spencer & his wife Nancy

community, Spencer was honored as Man of the Year at USU at the end of his senior year.

For graduate studies, Spencer and Nancy moved to Bryan, Texas, to attend Texas A&M University. Nancy finished a master of mathematics, and Spencer obtained a master of science in civil engineering with an emphasis in materials and pavements. Spencer received a Dwight David Eisenhower Graduate Fellowship to support his pursuit of a doctoral degree at TAMU in the same field. During this time, his employment at the Texas Transportation Institute provided him invaluable experience conducting research primarily funded by the Texas Department of Transportation. With international collaborators, he also became involved

in several cold regions pavements issues and was subsequently appointed to the Transportation Research Board Committee on Frost Action.

Spencer will be joining the transportation division within the Department of Civil and Environmental Engineering and is looking forward to continuing his research and teaching several classes relating to engineering materials and pavement design at BYU.

Spencer and Nancy have two daughters, Anna, 4, and Leah, 2, and they are expecting a son in September.

The department is very pleased to have Spencer joining the faculty and feel that he will be a great addition to our transportation programs.



Spencer's daughters (from left to right) Leah and Anna.

Civil Engineering Starts Online Courses

It is of interest to note that in this time of high technology the College of Engineering and Technology is lagging behind the rest of the university in the delivery of electronic based courses. To date, the college does not offer a single course over the web or via CD ROM. While we do offer a number of home study “paper” courses, we do not take advantage of our modern communication system.

Independent study courses have the advantage of allowing students to earn valuable university credit while remaining at home or during periods when there is a break in the campus schedule. Such offerings enable students to work around difficult scheduling problems more easily and often lead to earlier graduation.

Last year the Civil and Environmental Department decided to move more aggressively into this arena with the approval to create an electronic version of CEEN 305, Civil Engineering Materials. Dr. Olani Durrant was directed to begin the preparation of materials that would be “web friendly” and which, if successful, could be offered electronically.

CEEN 305 is an interesting choice as a first attempt to create an electronic course. It includes a heavy reading



schedule which suggests that a textbook should accompany the course. By doing this, the electronic materials can guide one’s study and add supplementary material that enhances learning. (As in any professors opinion, no book, other than one of their own, ever covers all the material adequately.) But, CEEN 305 offered another challenge—it includes laboratory exercises.

If you’ve taken CEEN 305 lately you remember that it included a lot of standing around the labs while someone else measured the specimens and ran the testing machines. After all, only so many hands can be used as once. As a consequence, what you watched in the labs has been captured on video and incorporated into the course. The data can all be downloaded so that all the information available to

the laboratory student will be available to the home study student. Data reduction and report writing can carry on for this “virtual laboratory” as readily as for the regular labs.

Early tests with some of the electronic laboratory exercises indicate that students do just as well either way and that many of them actually prefer the electronic experience. Further testing of these materials will take place this Fall with some students taking all labs on-line. (There are always some students, particularly those in athletics, that cannot schedule afternoon labs.) If all goes well, this course should be ready to move to Independent Study by next Spring.

CE En courses currently offered through Independent Study

CE En 103 - Statics

CE En 203 - Mechanics of
Materials

CE En 204 - Dynamics

CE En 332 - Hydraulics & Fluid
Flow Theory

Dr. Merritt helps organize these courses.

Dr. Les Youd Receives H. Bolton Seed Medal

Professor T. Leslie Youd has been awarded the H. Bolton Seed Medal by the American Society of Civil Engineers (ASCE) for 2002. By accepting this medal, Dr. Youd joins a small group of past recipients who are eminent international authorities in either general geotechnical engineering or specialists geotechnical earthquake engineering. The award was established in 1993 in memory of Professor Seed as a recognition of his many accomplishments in teaching, research, and the practice of geotechnical engineering especially as related to geotechnical earthquake engineering where he was a pioneer and the foremost international authority in the field. The Seed medal is awarded biennially for “cumulative distinguished contributions” to either geotechnical engineering or for contributions specifically to the field of geotechnical earthquake engineering. The award will be presented to Dr. Youd during the Annual Business Meeting of ASCE to be held in Washington, DC on November 6, 2002. The citation on the award will read, “*For his many important contributions to education, research and consulting in earthquake engineering, liquefaction, and seismic-related ground failure, his leadership in post-earthquake investigation and evaluations, his impact on site instrumentation in earthquake prone areas, and for his many publications and presentations, particularly his*



publications on updated, practical procedures for evaluating liquefaction resistance and lateral spread displacement.”

Along with the award, which includes a gold-plated medal, a certificate, and a cash prize, Dr. Youd will be invited to give the H. Bolton Seed Lecture to ASCE’s San Francisco Section during the coming year. This lecture will be video taped for widespread distribution. The written manuscript will be submitted to the ASCE Journal of Geotechnical and Geoenvironmental Engineering for publication as the 2002 H. Bolton Seed Lecture.

Some recent accomplishments of Dr. Youd that lead to the awarding of this prestigious medal include organizing and hosting of a workshop that updated procedures for evaluating liquefaction resistance of soils and publication of a report entitled, “Liquefaction Resistance of Soils: Summary Report from the 1996 NCEER and

1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils” (ASCE, Journal of Geotechnical and Geoenvironmental Engineering, v. 127, No. 10, p. 817-833, October 2001). Dr. Youd and his students S.F. Bartlett and C.M. Hansen developed widely used procedures for estimating potential lateral spread displacement at liquefiable sites (“Empirical Prediction of Liquefaction-Induced Lateral Spread,” Journal of Geotechnical Engineering, ASCE, v. 121, No. 4, p. 316-329, April 1994; and “Revised MLR Equations for Prediction of Lateral Spread Displacement,” Journal of Geotechnical and Geoenvironmental Engineering, ASCE, December 2002). Dr. Youd lead reconnaissance investigations following the August 17, 1999 Kocaeli, Turkey earthquake and edited a major report on that earthquake entitled, 1999 Kocaeli, Turkey, Earthquake Reconnaissance Report (Earthquake Spectra, v. 16, Supplement A, October 2000).

Recent Receivers of H. Bolton Seed Medal

2000 Richard E. Goodman
1998 Kenji Ishihara
1996 John Burland
1994 Izzat M. Idriss

ASCE Student Chapter

ASCE Continues Great Traditions



From going to Rocky Mountain Conference all the way to breaking some miniature balsawood bridges, this past year has been a very memorable one.

We have had live fish eating contests all the way down to designing one of the best concrete canoes. There were some hard tests and finals that the students overcame, and there was even good old fun in the Clyde Quad playing volleyball.

Let's not forget all of the service that was rendered to the local community during the Fall/Winter 2001/02 semester. Each student served four or more hours and this included such projects as;

Building Big. A program set up to go out and teach Middle and Junior High students about bridge building and get them excited for further education. It is also a national known program.

Planting trees around "Y" mountain. A recent storm caused much of the vegetation around "Y" mountain to go up

in smoke. So, the students decided that they would replace it.

Math Count. A program designed to help promote math education by sponsoring a state math competition for grade school aged youth.

As you can see, the students at



Brigham Young University have been hard at work not only with the books, but with their hearts. The motto to go forth and serve is evident in every student that comes into

the Clyde to study Civil Engineering.

In behalf of our American Society of Civil Engineers (ASCE) student chapter, we send a warm thanks and an outstanding invitation to always visit and teach the students what we have to look forward to when we graduate.

If you would be interested in speaking at our seminars on Thursdays please contact the Civil Engineering Office.

2002 ASCE Officers

- President - Mike Garner
- 1st VP - Jeff Dong
- 2nd VP - Troy Banks
Melisa Truitt
- Secretary - Kent Hulet
- Treasurer - Eve Pate
Sam Slade
- Publications - Charlie Thomas



Rocky Mountain Conference 2002 at Laramie Wyoming

Scholarship News

Continuation of Incredible Bonus for Scholarship Contributions

For the second year, a tremendous opportunity has been provided to us from very generous, anonymous, donors. These individuals have agreed to grant matching funds (as shown in the table below) for all donations to the University coming from BYU Students, Faculty, Staff, Alumni, and Friends of BYU. Our Department of Civil and Environmental Engineering has again chosen to place all funds received from this campaign directly to the departmental scholarship awards. Last year, the College of Engineering and Technology received more than half of all funds donated to the entire university. Civil Engineering ranked second in the college, with over \$200,000 funds received. Due to your generosity, we were able to double the number of scholarship awards given to our students. We hope all of you will again take advantage of this opportunity to provide additional endowed scholarships for our students.

Per Dollar Matching Levels:

	<u>Your Contribution</u>	<u>Donor's Match</u>	<u>Total Scholarship Donation</u>
*Current Undergraduate Students	\$1.00	\$5.00	\$6.00
*Current Graduate Students, and Alumni gone from BYU for 5 yrs. or less	\$1.00	\$2.00	\$3.00
*Current BYU Faculty, Staff, Retirees, and Alumni gone from BYU for more than 5 yrs.	\$1.00	\$1.00	\$2.00
*Friends of BYU	\$1.00	\$1.00	\$2.00

To have your donations eligible for this match, and to be placed in the department scholarships, simply follow the donation rules outlined below.

Rules:

1. All donations must be received by: December 31, 2002
2. Checks should be made to: **"Brigham Young University"**
3. In note section of check, write: **"Acct# 30120438"**
Note: Please do not write: "Civil Engineering"

anywhere on the check or the donations will not be matched

4. Donations are to be sent to:

Brigham Young University
Department of Civil and Environmental

Engineering

Attn: Scholarship Society
368 Clyde Building
Provo, UT 84602

5. Individual donations, up to \$25,000 only, will be eligible for match
6. Friends who would like to combine their donations, or Individuals, might be eligible for an endowed scholarship in their names. Please contact Dr. Steven E. Benzley, (801) 422-3620, for details and questions.

Alumni Activities



Alumni Fish Fry brought to you by the Scholarship Society

Don't miss the chance to celebrate and reunite with old BYU friends. Come to the Civil & Environmental Engineering / Scholarship Society / Alumni Homecoming Reunion October 18, 2002. The dinner this year will be at the BYU conference center, just East of the Marriott Center. We will begin with our leisure Social Hour from 5:00 to 5:30 p.m., on the east patio where you can visit with friends and make new acquaintances. At 5:30 p.m., our annual Fantastic Fish Fry Dinner will begin with fresh halibut and salmon from Alaska, followed by a short program. We will be finished by 7:15 p.m. which will enable you to enjoy other Homecoming activities on campus that evening.



Please send us the following information to BYU Civil Engineering., Attn: Janice, 368 CB, Provo, UT 84602. You may also RSVP at (801) 422-2811 or email at civil@byu.edu.

Name: Last _____ First _____ Middle _____
 Address: _____
 City/State/Zip: _____
 E-mail: _____
 Phone: wk () _____ hm () _____ Fax () _____
 Is this a new address? _____ Coming to Annual Fish Fry: No. attending _____ Adults _____ Children _____

Please RSVP by Monday, October 14.

Scholarship Society

Board of Directors

Doug Ferrell, Society Chair
 Brent R. Farr
 Reese J. Goodwin
 King Husein
 Ramesh Khona
 Bruce Larson
 David Layton
 Melvin Nichols
 Gene Shawcroft
 S. Olani Durrant

BYU Civil and Environmental Engineering Scholarship Society annually provides many students with scholarships to help them as they complete their undergraduate and graduate degrees within our department. We encourage you to join us in this effort which will bless the lives of deserving young men and women. Students are very appreciative of scholarships they receive. All contributions are given in direct scholarship funds to students based on accomplishments and need. One of our goals as a department is to strengthen and increase alumni involvement. Please fill out the form below and return it with your gift for the students. If you would like to be considered as a member of the Board of Directors, please contact Dr. Wood Miller, Department Chair, (801)422-2811.

NOTE: Once again all money given will be matched 2 to 1 for alumni from the last 5 years and 1 to 1 for all other alumni.

BYU Civil & Environmental Engineering Scholarship Donations

Name _____ Date _____
 Street Address _____ Amount _____
 City, State, Zip _____
 Phone () _____ Fax () _____ Email _____
 Check this box if your company matches your contribution.

SCHOLARSHIP SOCIETY
BRIGHAM YOUNG UNIVERSITY
CIVIL & ENVIRONMENTAL ENGINEERING
368 CLYDE BUILDING
PROVO, UT 84602-4081



CIVIL TALK
BRIGHAM YOUNG UNIVERSITY
CIVIL & ENVIRONMENTAL ENGINEERING
368 CLYDE BUILDING
PROVO, UT 84602-4081



Dr. Miller & Dr. Nelson Travel to Egypt

From April 27 to May 11 Dr. Nelson and Dr. Miller accompanied a group of two graduate and six undergraduate students to Cairo, Egypt.

The trip was the culmination of a semester-long collaboration project between students in the Environmental Modeling Research Laboratory (EMRL) that are working on the Watershed Modeling System (WMS) and hydrologic engineers from Egypt, Syria, Jordan, and Sudan. The program was sponsored in part by the Mentored Student Environment Program at BYU. This program seeks to have more undergraduates involved in significant research projects. Dr. Nelson, along with students in his research program, has been responsible for the development of WMS, a state of the art computer program for hydrologic modeling. WMS is used by engineers throughout the world for hydrologic modeling. It provided the impetus for the current collaboration activities in the Middle East. During the winter semester the eight students were divided into four teams of two and each group assigned to work with a designated contact in the four countries involved. They corresponded with their contact person to learn of the practices and needs for hydrologic modeling in the region and at the same time became more



Dr. Nelson & Dr. Miller on top the Aswan High Dam.

knowledgeable about WMS and hydrologic modeling in general.

Each pair of students also located as much pertinent data and information about the use of WMS in the designated region and worked to develop a pilot project of interest to the contact engineer. The trip to Egypt resulted in an opportunity to train the contacts from each of the four countries along with others in the use of WMS in general. The pilot projects gave them a chance to better demonstrate how WMS could be applied in their regions, and they were able to present them with the digital elevation and other data that was compiled.

Of course they didn't spend all of their time in the classroom as their hosts in Egypt saw to it that they experienced the marvelous sites in Egypt including visits to the great pyramids and sphinx, the large temples, the national museum,

the tombs in the valley of the kings and queens, and a boat trip down a portion of the Nile. One of the highlights of the trip was a brief tour of the Aswan High Dam.

The trip was a great success for both the BYU group and the Middle East engineers group. As an indication of the appreciation and successfulness of the collaborative project and trip, the chairperson of the National Water Research Center for Egypt, Dr. Mona El-Kady, invited Dr. Miller, Dr. Nelson and the students back to Egypt and presented them with a memorandum of agreement between Egypt and BYU to continue the exchange.



Liquefaction Mitigation with EQ-Drains

Liquefaction of loose saturated sands results in significant damage to constructed works in nearly every earthquake event. Liquefaction and the resulting loss of shear strength can lead to landslides, lateral spreading of bridge abutments and wharfs, loss of vertical and lateral bearing support for foundations, and excessive foundation settlement. Liquefaction resulted in over \$11.8 billion in damage just to ports and wharf facilities in the 1995 Kobe, Japan earthquake. Typically, liquefaction hazards have been mitigated by densifying the soil in-situ using techniques such as vibro-compaction or dynamic compaction. An alternative to densifying the sand is to provide drainage so that the excess pore water pressures generated by the earthquake shaking are rapidly dissipated thereby preventing liquefaction from occurring

One recent innovation for providing drainage is the EQ-Drain. EQ-Drains are vertical, slotted plastic drain pipes, 4 to 8 inches in diameter, that are installed with a vibrating mandrel in much the same way that



wick drains are installed for consolidation of clays. The drains are placed in a triangular grid pattern at center-to-center spacings of 3 to 6 feet depending on the permeability of the treated soil. In contrast to conventional wicks, which have very limited flow capacity (0.001 ft³/sec, for gradient of 0.25), a 4 inch diameter EQ-Drain can carry relatively large flow volumes (3.3 ft³/sec) sufficient to relieve water pressure in sands. This flow volume is more than 10 times greater than that provided by a 3 foot diameter stone column (0.23 ft³/sec). Filter fabric tubes are placed around the EQ-Drains to prevent infiltration of sand into the drain. EQ-drains can be installed more rapidly and at a fraction of the cost of stone columns.

To evaluate the effectiveness of these drains without waiting for an earthquake to test them, Dr. Rollins will be using a grid of explosive charges to simulate the liquefaction process produced by an earthquake. Monitors will measure settlement, pore water pressure and vibration during the test blasts. The rate of water pressure dissipation within two test arrays treated with 35 drains will be compared to the rate at an untreated site near the Massey Tunnel in Vancouver, British Columbia. Dr. Rollins will be working with Nilex, Inc, the developer of the drains, on the testing program. If field tests prove the effectiveness of the drainage technique, significant time and costs savings can be achieved for both new construction and for retrofit situations. Drains could be placed in zones around existing deep foundations to prevent liquefaction and increase lateral resistance or under shallow foundations to improve bearing capacity. Drains could also be placed in sections of a slope to prevent sliding or within loose backfill behind a quay wall to limit lateral movements.

IsoTruss™ goes International

The commercialization of IsoTruss™ grid structures was officially launched in 2002. In February, ILC Dover, Inc. signed a nonexclusive license agreement with BYU for IsoTruss™ grid structure applications in space. In April, BYU signed an exclusive license agreement with PYRAMatrix Structures, Inc., a new start-up company in Utah, for all other IsoTruss™ grid structure applications in the U.S. A third agreement was signed in May with TauRUSS, Inc., a new start-up company in Japan, for an option on an exclusive license for all IsoTruss™ grid structure applications in Japan and China and a nonexclusive license for a continuous automated machine concept to build IsoTruss™ grid structures. BYU is also currently negotiating IsoTruss™ grid structure licenses for other territories around the globe including Europe, Russia & Ukraine, Canada, Middle East, Central and South America. PYRAMatrix Structures, Inc. is marketing IsoTruss™ grid structures under the PYRAMatrix™ brand name. The rest of this article is the press release issued by BYU after the agreement was signed with PYRAMatrix Structures, Inc.

PYRAMatrix Structures, Inc., a company founded by the corporate development firm Wasatch Valley Technologies, has been granted the exclusive United States license to commercialize BYU's lighter-weight composite structure technology able to support burdens twelve times heavier than the maximum capacity of steel structures weighing the same amount.

“PYRAMatrix™ is the world's first advanced composite structure configured in a lattice geometry. This makes PYRAMatrix the lightest, strongest, most efficient structure available,” said Jerral R. Pulley, chairman of Wasatch Valley Technologies and former senior executive of Pepsico, Squibb, Borden and Ryder System. “Put next to a metal or ordinary composite structure with equivalent load-bearing capability, PYRAMatrix will always weigh dramatically less and, for many applications, cost less to make.”

The company has identified a host of promising additional applications where lighter-weight strength is critical: construction tilt wall braces, electric utility transmission and distribution towers, large over-the-road truck trailers, radar towers, communication towers, airplanes, outer space applications and oil drilling platforms. Recreational applications include: bicycles, motorcycles, ATVs, snowmobiles, motor boats, sail boat masts, recreational aircraft and sports gear racks for vehicles.

“Signing the licensing agreement has been the most exciting part of the process because it means this technology is being commercialized for real-world applications,” said Dr. Jensen. Dr. Jensen is also a consultant to the company and believes the license “opens the door to a lifetime of research into improvements and enhancements of the technology.”

J. Tracy Livingston, a partner in Wasatch Valley Technologies and PYRAMatrix's Chief Technology Officer, has studied performance characteristics and researched

markets for promising applications, including large electric utility poles, communication towers and wind turbines.

“It is becoming more and more difficult to obtain long-length, wood poles,” Livingston said. “We have a product that is not only competitive in load-bearing performance with increasingly expensive taller wood poles and large steel transmission towers, but is also lower in price.”

Livingston ultimately wants to help the renewable energy industry meet the need to build cost-effective, five-megawatt turbines. The steel tower to support turbines that large would “weigh more than one million pounds and cost about \$1 million to get to the site. It will cost only \$30,000 to get the PYRAMatrix tower to the site.”

Pulley and Livingston, along with their partner Christopher Derrington, CEO of Wasatch Valley Technologies and PYRAMatrix Structures, Inc., combed through 100 ideas and technologies for a year before choosing BYU's structural technology, known as the IsoTruss, as their partnership's first venture. ~Michael Smart (*For complete article see <http://www.byu.edu/news/releases/May/pyramatrix.htm>*)



(left to right) David Jensen, Christopher Derrington, Tracy Livingston, Jerrel Pulley and Wayne Clark.

Panelized Steel Deck Shear Walls

Dr. Warren Lucas and Dr. Fernando Fonseca in conjunction with Composite Framing Systems of Simi Valley, California, are studying the behavior of several innovative shear walls for use in areas subject to high seismic forces. The objective is to establish economic, engineering, and construction feasibility of the several concepts and the associated details.

Jim Chatterley (BS, BYU '69), CEO and Director of Research and Development for Composite Framing Systems developed the new shear wall concepts for use in low and mid-rise buildings in Southern California. These walls are sufficiently innovative that extensive full-scale testing is necessary before they can be used routinely in actual construction.



Side Elevation of the Steel Deck Shear Wall with Steel Boundary Columns



Panelized Steel Deck Shear Walls are most effectively used in a construction process known as balloon framing. Typically, low and mid-rise buildings are constructed using a platform framing process in which walls for an entire level are completed before the floor of the next level is started.

Balloon framing involves constructing significant portions of exterior supporting walls off-site and rapidly assembling the building's shell on-site from the prefabricated panels. This process can save appreciable time in the overall construction schedule and significant labor cost by assembling critical portions of a building in a mass-production environment.

The current series of tests involves a total of 12 shear walls. Construction of the walls was completed on May 31 and test

ing commenced during the last week of June. Troy Banks, a recent graduate of the Civil and Environmental Engineering program at BYU, now pursuing a Master's Degree, is responsible for assembling the testing results and the subsequent analysis for his thesis. Test results will be used to solicit additional funding from a consortium of material suppliers and the National Science Foundation later this year.



A very tired construction crew. From left to right, Jim Chatterley, Darrell Thornock, and Troy Banks. Not pictured, Matt Decker and David Anderson.

Dr. Lucas is also involved in two other projects. One involves the bond strength of corroded rebar in concrete, and the other involves optimization methods for design configuration of reinforced concrete floor systems and steel floor systems.

Satyendra Gupta ‘

Satyendra has worked as a Senior Consultant at the Asian Disaster Preparedness Center, Asian Institute of Technology, Bangkok, Thailand and he is also a visiting faculty member in the School of Civil Engineering at AIT. He was one of the founding members of ADPC which is now famous in the Asia Pacific region for disaster management works. One of his projects in the Philippines also won UN World Habitat Awards during 1990 and other awards from the Government of the Philippines and the UN-ESCAP Award. He did consulting for several agencies of UN system as well as for many international NGO on disaster mitigation. He also played a major role in the writing and publishing of a book “Disaster Mitigation in Asia and the Pacific” published by Asian Development Bank, Manila.

In July 1999 he returned to India and joined BITS, Pilani (a University of Engineering and Science) as a Professor of Civil Engineering. For the last two years he has been working as the head of Civil Engineering. He has been invited by the Government of India on two occasions (once by the Prime Minister’s Office PMO) during 1993 after the Latur, Maharashtra earthquake and in 1999 after Super Cyclone at Orissa to assist the state Governments of these states in their rehabilitation and reconstruction work.

He is now involved in the establishment of specialization (structural engineering and infrastructure systems) in a Civil Engineering Masters program and it will be offered starting August 2002. Recently he has been appointed as a Consultant of the World Bank to work on Disaster Mitigation Planning and Management for Earthquake for State of Andhra Pradesh, India.

Richard Frost

Rick started working in Georgia after graduation in civil/structural engineering. After 2 years of valuable experience he moved to Las Vegas, Nevada to work with other BYU graduates, Brent Wright, Gregg Memdenhall, and Frasier Smith doing structural engineering. After another 3 years of valuable experience he moved to Arizona - his home state. He started his own private structural engineering practice in 1995 in Prescott. He has had a lot of success considering the size of Prescott. He enjoys a small town atmosphere and yet he can provide services state-wide and elsewhere using the internet and fax. He is currently licensed in Arizona, California, Nevada, Colorado, and New York.

Mike Brown ‘98

Mike has worked with Wasatch Front Regional Council, the Metropolitan Planning

Organization for the Salt Lake area, since graduation. He was project manager charged with locating an ideal corridor in western Salt Lake County for an extension of the Legacy Highway (generally 5800 West), so that cities could work to preserve that corridor from development.

He also works with travel demand modeling, helping project 2030 roadway and transit usage for numerous infrastructure proposals, including freeway expansions, light rail, and commuter rail.

Mike has 3 boys, and is the Deacon’s Quorum Advisor in his Centerville ward.

John Dorny ‘98

After graduation in August of 1998 John took a job with Fehr & Peers Associates in Salt Lake City as a transportation engineer. He worked there 1 1/2 years and then moved to Reno and opened a Fehr & Peers office with another person in the company from Roseville, CA. **They have been there since and now there are seven in the office.** He has been promoted to Project Manager and has managed the transportation portion of projects such as Medical Center Master Plans, up to 8,000,000 square-foot private developments, transit related studies, environmental documents in California and Lake Tahoe, and has been involved with the traffic control

J. Dorny cont.

for the ReTrac project. This project involves depressing 2+ miles of train tracks that run through downtown Reno, an estimated \$240 billion project, and very controversial. They also do Beta testing CORSIM and VISSIM (3D traffic simulation). You can fly around and see traffic flowing over aerial photos as if you are in a helicopter (any elevation any direction). The software does cost \$11,000 though (one license).

He is thoroughly happy with this company. They provide opportunity for advancement by actively pursuing new markets and opening new offices. The company provides a wide variety of Transportation/Planning services but does not do any Civil Design. The closest they came to that is Intersection Signal Design.

He has three kids, one 3-year old girl (Cienna) and twins that were born in June 2001 (John and Julia). He bought a home in Reno, a wonderful city, and enjoys being around non-members in the community that ask questions about their beliefs.

Parry Harrison '59

Parry retired from the U.S. Bureau of Reclamation in 1987. He was the Regional Hydrologist for the Pacific Northwest Region from 1976 until

retirement.

From 1988-1989 he served a mission to Johannesburg South Africa. From 1999-2000 he served a service mission in Salt Lake City, Utah as an assistant to the construction manager for the church on the new conference center. He worked with Blake Dallin ('58) who was the structural steel consultant for the contractors on the conference center.

Rod Baker '85

Rod graduated from BYU with a BS in Civil Engineering in 1985. He went on to the BYU Law School, from which he graduated with honors in 1988.

He has used his engineering education in the practice of patent law. A registered patent attorney since 1991, he is now a partner in the law firm of Peacock, Myers, & Adams, the largest law firm in Albuquerque, New Mexico whose practice is limited to intellectual property law (patents, trademarks, copyrights, trade secrets). Patents he has obtained on civil engineering related inventions include: Pat. No. 5,277,518 "Contamination Remediation, Biodegradation and Removal Methods"; Pat. No. 5,373,727 "Miniporopermeameter"; Pat. No. 5,384,051 "Supercritical Oxidation Reactor"; Pat No. 5,390,846 "Welding Gas Purging Apparatus"; and Pat. No. 5,398,472 "Fiber-bale Composite Structural System

and Method".

Rod, his wife Tami, and his four children are active in the Cedar Crest ward, Albuquerque East Stake, where he teaches primary.

Thom Rich '73

Thom and his wife of 33 years, Kathy, have lived in Farmington, Utah for the past 14 years where they are living happily-ever-after as empty nesters. After graduating, Thom spent a year at Fluor Corporation in Los Angeles and then four years at several small engineering firms in Utah. He is licensed in four states. Engineered sales beckoned in 1978 and he has spent the last 23 years designing and marketing overhead cranes for two local firms. In July 2000, Thom and another BYU alum, Curtiss Doel (ME '92), started Overhead Cranes International, a design, sales, service and manufacturing company of overhead cranes and monorail systems. Fond memories of the old engineering building, manual-mechanical calculators, slide rule accuracy and President Ernest L. Wilkinson doing push-ups at devotionals still linger.

Rex Bliss '79

Rex worked for the Federal Highway Administration for 20 years. He served in several capacities - designed roads, wrote a manual with the latest

R. Bliss cont.

technologies for government standards, taught the course across the country, served as project manager and most recently worked on safety issues. He received many awards and recognition along the way. Rex passed away December 18, 1997 of stomach cancer.

Blaine Greenhalgh '65

Since graduating with a BS in Civil Engineering, Blaine worked for American Potash at Trona, California and then for Disneyworld. He did the engineering design for one of the rides and for utilities in an underground tunnel in Disneyland. He then worked as a design engineer for Bechtel in L.A., specializing in utility lines for electrical power companies. Blaine then worked for Bear Creek Mining Company until 1985. Beginning in October 1985 he served four LDS missions with his wife. The first mission was served in Oakland, CA; after which the Greenhalgh's spent six months in an Indian Reservation at Selcs, AZ. From July 1989 - December 1990 they were in the Philippines and from August 1992 - February 1994 they served in Hawaii. He is presently 83 years old. Blaine and his wife were serving in the Mesa Temple until his wife was diagnosed with multiple myeloma. He still has his Utah State surveyor's license.

Emily Christensen '99

Upon graduation in 1999, Emily joined the Peace Corps of the United States. She was assigned to be the project manager and an engineer on a rural village water supply project in Lesotho Southern Africa. Eighteen full-time employees, and countless villagers have worked together to give 15 villages access to clean drinking water. The villages are rather remote; nine of them are accessible by road. (Riding a horse ten hours one way is part of her job description.) The area is beautiful and the people are amazing, if anyone is interested in visiting southern Africa, or would just like to send mail, she'd love hear from you. emily@backpacker.com

Duane Greenwood '85

When he is not at work, Duane is usually busy as a Boy Scoutmaster, participating in the Oroville Optimist Club, remodeling his 1930's farmhouse, taking care of his small pecan and walnut orchard, or taking care of family needs. His wife, Cynthia is an accounts payable clerk with Butte County Office of Education. When she is not at work she is usually busy completing her ward Relief Society President duties and taking care of family needs. Their oldest son, Karl, is a sophomore at BYU and is a Business major. He will be going on a mission this next summer. Their daughter Eileen is a Junior at Oroville High School. Their youngest son is a 7th grader at Nelson Avenue Middle school in Oroville, CA.

Elwin C. Robison '78

Elwin continues to teach at Kent State University in the School of Architecture and Environmental Design, and is principle of his consulting firm, Elwin C. Robison & Associates, specializing in historical, forensic, and engineering analysis of historic buildings. He recently completed the historical analysis and resoration of the John Johnson home in Hiram, OH and is currently working on the restoration of the Burton Wescott House in Springfield, OH by Frank Lloyd Wright. He is also working on the Eleutherian College Chapel in Souther Indiana. He is also the author of the book *The First Mormon Temple: Design, Construction and Historic Context of the Kirtland Temple*.

James W. Roberts '63

James retired on 31 July 2002 with 42 years of Federal Governement service. His most recent assignment was Master Planner for the Defense Depot San Joaguin in Tracy CA. He has worked for the Postal Service and Bureau of Reclamation both in Provo. Then S.F. District of the Corps of Engineers and National Parks Service in San Francisco, CA. James and his wife have 6 children - 5 boys and 1 girl - one boy passed away in May 2002. They have 10 grandchildren. Service in the church has included Bishop, High Councilor, Employment Specailist and Sunday School teacher.

Brigham Young University
Department of Civil & Environmental Engineering
368 CB
Provo, UT 84602-4081

Nonprofit Organization
U.S. POSTAGE
PAID
Permit No. 49

ADDRESS SERVICE REQUESTED