



SEAU NEWS

The Newsletter of the Structural Engineers Association of Utah

Volume VII- Issue I September 2002

This newsletter is a monthly publication of the Structural Engineers Association of Utah.

Articles or advertisements appearing herein may be submitted by anyone interested in expressing a viewpoint on structural engineering.

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Adams Ave. Bridge link to I-84 south over the Weber River and Union Pacific Railroad tracks in Ogden, Utah, by Ellis & Associates

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SEPTEMBER EVENT

SEAU Fall Social

Presented by:
SEAU

Program Date:

Friday, September 20, 2002
6:30 p.m. Social Hour
7:00 p.m. Dinner
8:00 p.m. Entertainment

Location:

Wheeler Historic Farm
6351 S. 900 E.
Murray, Utah

MESSAGE FROM THE BOARD

SIX GOALS OF SEAU



By Larry Reaveley,
SEAU President

At the start of this year, I thought that it would be good to revisit the six goals that were outlined for SEAU when it was organized in 1980. These six goal are listed on page two of our membership directory. They were:

1. Promote acquaintance and understanding among Structural Engineers-

- 2. Promote technical expertise-
- 3. Promote legislation and codes relating to Structural Engineering-
- 4. Increase public awareness of Structural Engineering-
- 5. Discourage unethical and detrimental practice-
- 6. Promote high standards of Structural Engineering in the best interest of clients, community, public and the profession-

These goals seem quite appropriate for today, and appear to be an excellent basis for a strategic plan for the organization this year. Specific activities that have been planned by the board address most of the goals.

The opening social (Sept. 20) meets the objectives of goal one. A golf tournament, dinner, dancing, great food, and fun entertainment await all that attend. Our monthly meetings are focused on goal two. We are attempting to offer outstanding learning opportunities for all of our members. Those that do take the

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NEW SEAU OFFICERS FOR 2002-2003

SEAU Board Members for the 2002-2003 Year

Office	Board Member	Telephone	FAX
President	Dr. Larry D. Reaveley	581-6931	585-5477
Vice President/President Elect	Ron Dunn	575-8877	575-8875
Past President	James M. Williams	575-6455	575-6456
Treasurer	Barry Arnold	782-6008	782-4656
Secretary/Historian	Jeff Miller	486-3883	485-0911
Member of the Board/UEC Delegate	Julie Ott	328-0278	328-0270
Member of the Board/UEC Delegate Elect	Carl Eriksson	(435) 615-5107	(435) 615-4900



Larry Reaveley



Ron Dunn



Barry Arnold



Jeff Miller



Julie Ott



Carl Eriksson

MEMBER FORUM

FOCUS

Utah Structural Engineers provide a significant contribution to a wide variety of projects for commercial, government, industrial, and residential clients. Each month, SEAU would like to focus attention on the accomplishments, successes, and hard work of our Utah Structural Engineering firms. This month the focus is on:

ESI Engineering, Inc.

ESI Engineering is a local multi-disciplinary engineering and surveying firm founded in 1967. The firm's 19 employees include structural engineers, civil engineers, land surveyors and drafting personnel. Two of our engineers, Philip Roberts and Frank Bonell, are members of SEAU.

ESI's structural engineering projects range from residential design to the design of salt production facilities worldwide. ESI also provides structural consultation for many local cities and counties, performing civil and structural plan review services and municipal civil and structural engineering design.

The following projects are representative of design work ESI is currently involved with.

Summit Water Treatment plant located in Summit County utilizes cast in place reinforced concrete for many of the structural components. This includes 6 underground tanks with associated suspended floor slabs supporting filtration equipment loads above. The sloping site necessitated 16-foot high retaining/foundation walls at the rear and side perimeter.

High ground water levels complicated the design requiring consideration of buoyant forces



Summit Co. Water Treatment Plant

and potential saturated soil conditions.

Hamlet Square Towers is a two story office complex located in Salt Lake City. This building utilizes steel moment frames for lateral stability and steel/concrete deck, open web K-series joists, and tube columns for interior framing. The clock tower uses braced frames for upper level framing that ties to roof and floor diaphragms for lower level stability. Typical of the Salt Lake



Hamlet Square Towers

valley area, surprise locations of loose fill and debris were discovered during footing excavation that required reevaluation of floor slab and foundation design.

The Fisher residence is an 8,000 square-foot residence located in Summit County. Typical of residential designs common in our mountainous areas, this floor plan required large open areas; extensive window filled walls, minimal available shear walls and heavy roof snow loads (175 psf). These types of structures require inventive lateral design resolution

with numerous drag strut lines directing lateral loads back to minimal available shear wall elements.



Fisher Residence

Cargill Salt manufacturing facility is located at Lakepoint near Grantsville. The Cargill facility is typical of many salt production facilities designed by ESI around the world. The Lakepoint plant consists of an 85-foot tall braced frame grading tower, 45,000-square-foot masonry shear wall and braced frame warehouse and packing area, 45-foot tall precast double tee dryer room facility, and a reinforced concrete rail car loading dock area. The grading



Cargill Salt Mfg. Facility, Grantsville, UT

tower housed two large vibrating screens that required consideration of floor and frame natural frequencies in order to reduce the possibility of a resonant response. ESI Engineering also designs the salt harvesting, salt staking and salt washing equipment for these facilities. A picture of a stacking frame designed by ESI was shown on the cover of the May 2002 issue of SEAU NEWS.

MESSAGE FROM THE BOARD (continued from page 1)

time to attend are better engineers for being there.

Goal three is being addressed by our legislative committee by assembling legislation that would deal with the plan checking issue, and the Structural Licensing requirements.

We have not specifically targeted goal four at this time. Members that would like to undertake an activity in this area are urged to contact any board member.

Goal five is always a difficult thing to find specific actions that directly deal with the basic problems

that require such a goal. Each member is encouraged to discuss specific problems of this nature with the appropriate SEAU Committee or a board member. Our developing "standard of practice/care" document should allow each member to better understand the expectations of members of the organization. Specific action will be taken in egregious situations.

Goal six should be the real outcome of the "standards" document. During the past year, I have reflected on the state of practice that seems to exist. I

believe that there has been great progress over the years, but many of the same old problems do still exist. There is a new generation of engineers that must be taught by example, through formal seminars, and by the school of hard knocks. It follows, then that the original six goals of the organization were well posed and have somewhat of a timeless quality about them.

The board requests comments and suggestions that would lead to better serving your needs.

SEAU COMMITTEES

SEAU has several committees that manage the areas of interest to the association. If you would like to support your association, join a committee! SEAU committees, chairpersons, and board representatives are listed below. Call the chairperson or board representative of the committee you are interested and learn more about what they do and volunteer your help.

Committee	Chairman	Board Representative
Audit	Leon Williams	James Williams
BSSC Delegate	Parry Brown	Jeff Miller
By-laws	Brent Maxfield	Julie Ott
Codes	Mark Harris	James Williams
Emergency Response	Barry Welliver	Carl Eriksson
Legislative	David Brown	Julie Ott
Membership	Jerel Newman	Barry Arnold
NCSEA Delegate	Craig Cartwright	Larry Reaveley
Newsletter	Mike Buehner	Carl Eriksson
Prof. Practice & Ethics	Jonathan Richards	Ron Dunn
Programs	Newland Malmquist	Larry Reaveley
PR/Web Page	Dave Cassett	Jeff Miller
SAC to UBC Comm.	Brent White	
Seismic	Ken Willmore	Ron Dunn
Structural Licensing	Kelly Calder	Barry Arnold
Technical	Russell Merrill	Carl Eriksson
UEC Delegate		Julie Ott
USSC Delegate	Barry Welliver	Ron Dunn

IBC 2000 UPDATE FROM THE CODE COMMITTEE

Greetings SEAU members from the Codes Committee. We hope you're sitting down when you read this article, because you're in for a shock. If you do masonry design you'll want to pay close attention.

The design of reinforced masonry per the IBC 2000 basically defers to ACI 530. However, there are some exceptions cited. One exception in particular is going to give all of us hard working structural engineers a run for our money. This issue is lap splice length. OUT-48 bar diameters. IN - Equation 21-2 of the IBC.

$$l_d = \frac{0.16d_b^2 f_y \gamma}{K \sqrt{f'_m}} \quad \text{(Equation 21-2)}$$

where:

- d_b = Diameter of reinforcement, inches
- f_y = Specified yield stress of reinforcement, psi
- f'_m = Specified compressive strength of masonry at age of 28 days, psi
- l_d = Required development length of reinforcement, inches
- K = The lesser of masonry cover, clear spacing between adjacent reinforcement, or 5 times d_b , inches
- γ = 1.0 for No. 3 through No.5 reinforcing bars
 1.4 for No. 6 and No. 7 reinforcing bars
 1.5 for No. 8 and No. 9 reinforcing bars

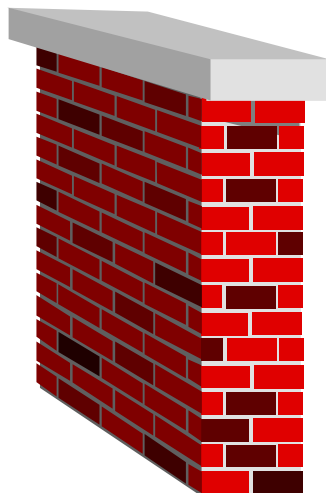
So far you're probably saying yeah so what another equation that's going to give us roughly the same answers that we have always had. Oh contraire!

Assuming 8" CMU and $f'_m = 1500$ psi, take a look at what this means for bar lap lengths!

BAR SIZE	(1) BAR / CELL	(2) BAR / CELL
# 3	19 in	19 in
# 4	25 in	30 in
# 5	31 in	49 in
# 6	57 in	105 in
# 7	79 in	152 in
# 8	113 in	229 in

This table makes it pretty clear that it will be very difficult to use bars larger than #5 in typical masonry construction (i.e. 48" lift heights). The above equation has been adopted as part of ACI 530-02. The commentary in ACI 530 indicates that the lap splice requirements are based on developing a minimum reinforcing steel stress of $1.25 f_y$. This provides a consistent requirement for lap splices, mechanical couplers, and welded splices. The traditional bar lap requirements were based on the bond stress developed between the reinforcing steel and the surrounding grout. Testing has shown that this is just one of several potential failure modes. Other failure modes include reinforcing steel rupture and longitudinal splitting of the masonry over the lap length.

We hope this heads up helps you with your masonry design and hopefully saves you from a painful construction phase change order.



BULLETIN BOARD**BULLETIN BOARD EDUCATOR FEATURE**

Each month from this issue and for the next several months, *SEAU News* will be highlighting a Structural Engineering educator from one of Utah's engineering schools. This month's feature is the following:



DR. JANICE J. CHAMBERS

Dr. Janice J. Chambers (formerly known as Janice J. Trautner) has been a professor of Civil and Environmental Engineering at the University of Utah Since 1989. Her influence over civil engineering graduates of the University of Utah pursuing careers in structural engineering over the past decade has been profound. In addition to providing educational guidance and research opportunities for many students, she teaches courses that are fundamental to the structural engineering profession. Courses that Dr. Chambers has taught include Statics, Mechanics of Materials, Steel Design I, Steel Design II, Matrix Structural Analysis, Reliability Engineering, and Advanced Computer Aided Design.

Dr. Chambers is a "steel person" with particular expertise in reliability. She was the principal investigator on a grant to perform full-scale tests on the Slotted-Web™ connection, and she performed the non-linear FEA on the prototype SidePlate™ Connection. She also derived the closed form solution of the stiffness matrix of the reduced beam section. All three of these moment-resistant connections now exist in many steel structures in high-seismic areas.

Professor Chambers is also working on a new method to efficiently compute the probability of failure of complex structural systems. Development and testing of this technique remain part of her current research activities.

Since the full-scale laboratory testing of structures can oftentimes be inefficient, Dr. Chambers' research includes development of mathematical modeling to a high degree of accuracy. Her research activities have included many finite element analyses (FEAs) of steel

components. She is an author of several conference papers related to the finite element modeling of bolted connections.

Dr. Chambers is a Certified Professional Engineer in the states of California, Utah, and Colorado and also a Certified Structural Engineer in the state of Utah. She received her degrees from the University of Missouri, and the University of Colorado. Prior to teaching at the University of Utah, Dr. Chambers worked as an engineer/analyst for noteworthy corporations including McDonnell Douglas and Fluor-Daniel. Most recently she spent a year sabbatical at the Tokyo Institute of Technology where she taught courses in Advanced Steel Design and Civil Engineering English. She has been a member of SEAU for the past 12 years.

SEAU News is proud to feature Dr. Chambers in this month's newsletter and offers its gratitude to her for having such a positive influence over structural engineers educated at the University of Utah.

If you had an engineering professor at BYU, the U of U, or USU that you believe should be recognized in *SEAU News*, please contact the SEAU Newsletter committee or send and email to jjohnson@reaveley.com.

NEW SEAU ADDRESS

SEAU has disbanded its central executive office and will no longer employ the services of former executive director, Peggy Ogzawalla. SEAU thanks Peggy for her outstanding help during her tenure. All communication to SEAU should now be addressed to:



SEAU
P.O. Box 581292
Salt Lake City, UT 84158-1292

www.seau.org

BULLETIN BOARD

SEAU MEMBERSHIP APPLICANTS

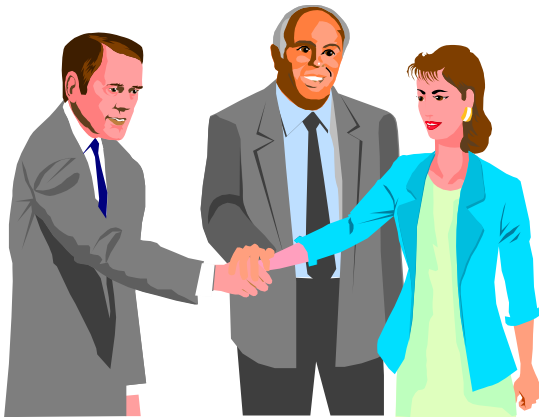
The following individual has submitted an application for approval by the SEAU membership committee for new members:

1. Joseph H. Walton, Student

THIS SPACE FOR RENT

The newsletter is an excellent forum to target a very select group of professionals for advertising. To find out more contact:

Jerod Johnson,
c/o Reaveley Engineers & Associates, Inc.
1515 South 1100 East
SLC, UT 84105
Phone 486-3883, Fax 485-0911
Email: jjohnson@reaveley.com



FROM THE EDITOR

Important Announcement to All SEAU Members!

The SEAU Newsletter Committee and SEAU Board of Directors have decided to improve our method of delivery of our monthly newsletter, SEAU NEWS, at the outset of this new association year. The September 2002 issue will be printed and mailed to all members as in the past and will also be emailed to members and posted on the SEAU website. Starting with the October issue, we will post the newsletter on the website and email the newsletter to all members for whom we have an email address. ***If you do not want the electronic version and prefer the printed version, you must notify the newsletter committee that you wish to have the newsletter mailed to you.***

Our reasons for boldly forging ahead using new technology are twofold. Electronic distribution of the newsletter will get information to our members much sooner than the old method. We can also save our association a significant amount of money each year that could be directed toward other programs.

As always, we appreciate any input and suggestions you may have.

Mike Buehner
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SEAU Presents:

SEAU FALL SOCIAL

Friday, September 20, 2002

6:30 p.m. Social hour, music & dancing

7:00 p.m. Dinner

8:00 p.m. Entertainment with more music and dancing afterward



Location:

Wheeler Historic Farm

6351 South 900 East, Murray, Utah

Dress: Semi-Casual

RSVP: SEAU Office (801) 321-0259

Cost: SEAU Members – no charge, Guests \$25.00

A nine-hole golf tournament will be held at 1:00 pm on the 20th at Rose Park Golf Course, 1386 N. Redwood Road. Cost is \$22/person which includes a cart. Reservations need to be made with Dave Pierson at (801) 782-6008, or email him at davep@arwengineers.com.

STRUCTURAL ENGINEERS ASSOCIATION OF UTAH

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Julie Ott, *Member of the Board/UEC Delegate*

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