SEAU *NEWS*

The Newsletter of the Structural Engineers Association of Utah

Volume VIII- Issue II October 2003

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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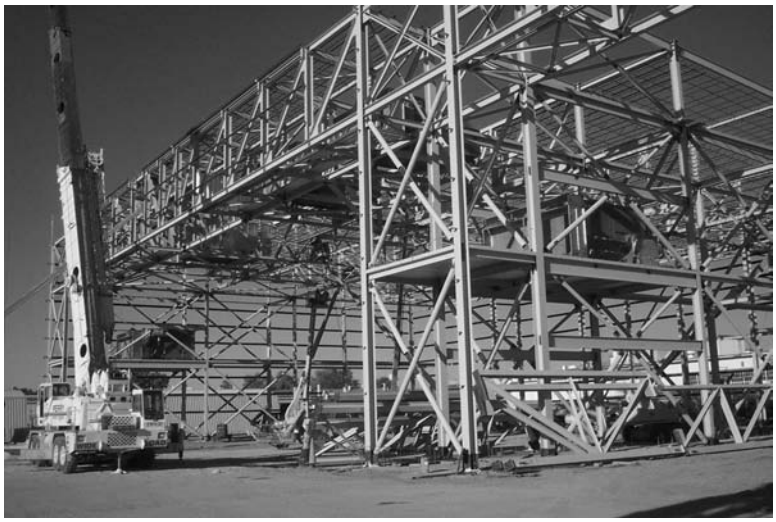


C130 Corrosion Control Hanger, Hill Air Force Base, Utah, by SURE STEEL, Inc.

IN THIS ISSUE

OCTOBER EVENT

SEER Seminar

Presented by:
August W. Domel, PhD. PE, SE
Chad R. Fischer

Date:
Thursday, October 16, 2003
8:00 a.m. to 3:30 p.m.

Location:
Panorama Room
University of Utah Union Bldg.

Cost:
$35.00 for current SEAU members.

MESSAGE FROM THE BOARD

MENTORING

By Barry Arnold,
SEAU President Elect

Being a mentor is one of those often overlooked obligations we have as engineers. However, it is crucial to establishing and maintaining the bar and developing a level of competence, skill and knowledge within the profession.

Proper mentoring of young engineers is critical to the profession.

When I graduated with my Masters degree, I thought I knew everything I needed to know about engineering. Looking back, I now realize that I probable knew less than 10% (maybe less) of what was required to successfully complete a project. Most of my time was spent asking my mentors numerous questions. I felt a need to know for myself how to obtain the answers and understand the explanations that were given to me. My first two years were spent working eight hours at the office and them going home and reviewing the work I had done that day and studying long hours to verify and double check the things that I had learned that day.

Luckily for me George Adamson, one of my many mentors, was a patient man. I was always quizzing him why, how come, and how do you know? I was inquisitive, but I'm sure George thought I was just really obnoxious. Being the good man

CONTINUED ON PAGE 3

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:

Hales Engineering

Hales Engineering is located in Ogden, Utah. The business's roots began in the mid 1970's by the late D. Brent Hales primarily as a residential design service. In 1999, his son Tom joined and added structural engineering services to the business. Currently the firm consists of one structural engineer, four drafting personnel, and two part-time drafting/clerical personnel. Tom has been a member of SEAU since 1993 and graduated with a Bachelor's Degree from Utah State University and a Master's of Science Degree from University of Utah.

The firm specializes in residential and small commercial design. Projects are mostly located in the Ogden area, however, some projects have extended to areas like Island Park, Idaho, Powder Mountain Resort, and Summit County area. Because of the smaller nature of the projects, the design work consists primarily of wood design with some steel, concrete and masonry design. Over the past four years the firm has experienced considerable growth and has more than doubled in size and project output.

The following projects are samples of the design work Hales Engineering has been and is currently involved with.

The Ogden Christmas Box House is a shelter facility for children consisting of wood construction. The building consists of two main wings: a dormitory wing and an administration or office wing. The dormitory wing contains a large clerestory area which provides natural light to a large central common area. Large girder trusses are used to create this large common area yet provide support for both the upper and lower roof levels.

Residence in North Fork is a 4,000 square-foot residence. The design incorporated large rough-cut timber trusses with tall window-filled walls and a floor layout with large open areas. This particular residence included a design adapted to a steeply sloping lot and a roof snow load of 75 psf.

Professional Haven Dental and Chiropractic Office is an office building located in West Haven. The building has two levels with the top level accessed from the street level and the lower level accessed from a lower parking level. This building is unique in that it has a triangular footprint to allow the building to be situated on a triangular shaped lot. As a result, a unique approach was required to frame the roof and floor. Tall concrete retaining walls were used to retain the upper parking area from the lower parking area.

Residence in North Ogden is an 11,000 square-foot two-story residence with a full basement. This includes an unobstructed living space under the garage which utilizes clear-span pre-cast concrete panels with a reinforced topping slab. It also includes an upper floor living area over the garage that is incorporated in the roof truss design. Again, large open areas in the floor plan and tall walls with windows were important features of the design.

MESSAGE FROM THE BOARD (continued from page 1)

that George is, he helped me through all my questions by sometimes telling me an answer and having me verify it or guiding me in a direction to a solution and then questioning me about my solution. It was a lengthy and essential learning experience for me. Now, I chuckle when I am at the office and find my self remembering and emulating George's ways as I help young engineers understand the principles and ideas that will make their project successful. I often find myself rehearsing things he told me many years ago and applying them to situations I face today. He had a huge impact on me because he mentored me correctly. George was always supportive and helpful, he never let me take the easy way out – he helped me learn.

I mentioned George above, but the truth is that I have had many mentors. I have worked with some of my mentors and others were passing acquaintances. Many of you may not know it but in a small way you too were my mentor. At the SEAU membership meeting, conferences and socials I asked a lot of questions about how you handle design problems. Most of the time my questions were met with great enthusiasm and I came away from our encounter enlightened and enriched. I am grateful to all of those of you who have so freely shared your knowledge and understanding with me. Many of you have had a part in molding me into the engineer I am today.

Some young engineers have stated that they left their place of employment (or the profession entirely) because they did not have a proper mentor. There was no one to instruct and guide them through the complexities of the code or help them gain a firm grasp of basic and crucial engineering concepts. They felt overwhelmed with the requirement of the job and were disappointed in the little support they received from their superiors.

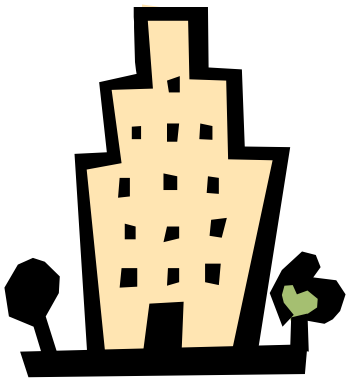
The SEAU Code of Ethics states that "...and shall provide opportunities for the professional development of those engineers under their supervision." Being negligent in mentoring could be construed as a violation of your professional obligation to the young engineers within the profession and you could be jeopardizing the health safety and welfare of the public.

It all boils down to this: Don't forget to be a mentor! It is an ethical obligation you have so that the health, safety and welfare of the public are protected.

The flip side is also true: Don't forget to look for mentors within the profession. It does not matter how long you have been practicing engineering you always need to sharpen your skills. SEAU will cosponsor a few seminars (one from ACI and one from AISC) this year that will be valuable to all structural engineering professionals. In addition SEAU will also be holding monthly membership meetings which will focus on sharpening our technical skills through presentations on a variety of useful subjects. Our President, Ron Dunn, has also proposed holding a couple of lunch meetings during the year with a guest speaker who will be focusing on the business side of our profession. SEAU has a number of committees where ideas are expressed and thoughtful discussions are held - get involved and join one of them. SEAU is loaded with the best engineers around. I am always impressed with the high caliber of professionalism SEAU represents.

The Board has a great year planned for you. Please come and attend all the meetings you can and plan on mentoring others by sharing your wisdom and knowledge with them and be mentored by those who are tops in their field. By your full participation it will be a great learning experience for all of us.

As an aside to this topic, I noticed throughout my time as a Member of the Board that there were many great tidbits of information that I obtained from the members of the Board. I felt it a shame that the whole membership did not have an opportunity to hear these bits of wisdom and have an opportunity to somehow incorporate them into their offices. Because of this, I, me, Barry Arnold asked the current president, Ron Dunn, to provide, a brief article in each newsletter that will provide these bits of insight for all of us to contemplate. I take full credit for this idea and in all honesty Ron was somewhat hesitant to oblige my request. Ron is one of my current mentors. I have met a lot of great engineers but few have given so freely and openly to help me personally, as an employee, as an employer, and as a professional. I respect Ron a lot because throughout our interactions together I have found him to be truly focused on the dignity and success of the profession and always having an us, never a me attitude. I look forward to being enriched by his wisdom.



BULLETIN BOARD

MESSAGE FROM THE PRESIDENT

We have officially begun our fiscal year of SEAU work. Committees are now funded and beginning to work toward goals and assigned tasks. The calendar is beginning to fill with upcoming meetings, seminars, lunches and special occasions. If you do not fully engage yourself within the next few weeks, chances are you will watch from the sidelines as this year unfolds. Critical views from the sidelines are not productive and represent a lack of courage to get involved. Call someone now. Share your knowledge with others and challenge yourself to give to our great organization. You truly will benefit from your participation. You might even make new professional acquaintances!

Our opening social was intended to begin this year with a nice evening together. We understand that time is valuable and recognize that some of you could not be there. For those of you who did attend there was much to gain. I can't help but wonder….

Just when was it we lost our desire to party? Maybe it began when as students we had to essentially give up our social life to meet the requirements of labs, lectures, homework and very little sleep. Some of us even got married to ease the demands of dating! It even helped to be financially broke so if the temptation to have a night out came we could not afford to go. We assumed we would have a great time "*after*" we got out of school.

Then came the first job. We wanted to do everything we could to impress our boss. Why didn't we learn this stuff in school? Now we even have more to learn, not much time and so many deadlines. We tell our spouses we can't go out tonight. Then as we became more proficient, we were required to do more. Even more deadlines, and how do we manage all these people? It is not amazing that we can now design faster, it is amazing many of us actually had the time to have children.

Our opening social was hopefully a enjoyable night for those who attended. If not, ask yourself the question: When was it I lost my talent to socialize? The social is probably the only opportunity we have to get acquainted with many of our fellow associates. This event is a non-threatening environment in which work need not be discussed. If you did not meet at least five new people at the social, shame on you. For all of you non-party folks who left before 9:00, the party went on until almost 10:00! For your convenience we held the social on Friday night so that babysitters could be arranged and no one would be late to work the next day.

I mentioned that we all benefit from the original organizers of SEAU. We have great engineers from whom we can learn much. I submit that we can also learn how to have a good time. Compliments to one of our best: Ed Allen and his lovely wife were the last couple to get off the dance floor. Ed, thank you for showing us how to have a good time. This social part of our life should be equally important. Let's enjoy this coming year together.

Ron Dunn
President, SEAU

BULLETIN BOARD

BULLETIN BOARD SPECIAL FEATURE

Beginning this month SEAU will feature recent building code developments and design requirements. This month our focus is on:

ACI 318-0 – A STEP TOWARD UNIFORMITY

For many years ACI 318 has existed virtually within it's own sphere of prescriptive requirements for strength design of structural concrete. As structural engineers, our responsibility has been to familiarize ourselves with the criteria outlined in adopted codes with respect to all of the different materials commonly used for construction including concrete. For many years debates have centered around the Allowable Stress vs the Ultimate Strength theories of design. Even within the circles of Ultimate Strength Design disparities have existed for issues as fundamental as load combinations. Why has this been the case? Do loads automatically alter themselves in accordance with the materials that are ultimately providing resistance? Of course not. However, such irrational conclusions might be drawn upon comparing load combinations of different codes. Fortunately, ACI 318-02 (referenced standard for structural concrete in IBC 2003) has taken a significant step to the unified set of loads and load combinations prescribed by ASCE 7.

So, what is the catch? Do we now simply use 1.2D + 1.6L in lieu of 1.4D + 1.7L for concrete design? Unfortunately there is more to it. To account for the lower design forces prescribed by the ASCE 7 combinations ACI 318-02 has adopted more conservative ϕ factors for use in design. The net result is that typical designs between the 99 and 02 codes should change very little.

Although ϕ factors are applied to nominal capacities in the same manner as in previous codes, ACI 318-02 has adopted new conventions in the criteria for defining the value of the ϕ factor for flexural and axial design. Whereas earlier versions of ACI 318 defined a ϕ factor of 0.9 for members acting in flexure, ACI 318-02 requires that the ϕ factor be a function of the net tensile strain of the section (ε_t), be it a beam or a column. For net tensile strains of 0.005 or more, the member is classified as Tension-Controlled and has a ϕ factor of 0.9. For net tensile strains of 0.002 or lower the member is Compression-Controlled with a ϕ factor of 0.65 (0.7 for spiral confinement). Intermediate values of ϕ are to be linearly interpolated. Does this mean that a simple beam can have a ϕ factor of less than 0.9? Yes. For net tensile strains less than 0.005 the ϕ factor should be less than 0.9 accordingly. However ACI 318-02 requires that the net tensile strain of sections with axial load less than $0.10f'cA_g$ (most beams) be at least 0.004. This ensures a tension controlled mode of failure and is not unlike the $0.75\rho_b$ provision of earlier versions of ACI 318. So what if my beam has a net tensile strain less than 0.004? This can be the equivalent of having a ρ value greater than $0.75\rho_b$ and is typically corrected by using less reinforcement or increasing the member dimensions. The ϕ factors for other loads (i.e. shear) have decreased nominally as outlined in ACI 318-02

ACI 318-02 makes no distinction between typical beams and columns when prescribing the criteria and requirements for axial and flexural design. Hence, the ϕ factors described above are calculated the same for both. For columns, earlier versions of ACI 318 prescribed a ϕ factor of 0.7 (tied) that could increase to as high as 0.9 when axial loads were low and the member was behaving more as a beam. Whether the ϕ factor could increase was purely a function of axial load. The ACI 318-02 criteria fundamentally provides the same effect but the result is much more dramatic. For high levels of net tensile strain the column is acting more like a beam and the higher ϕ factor is justified. Perhaps the most notable difference is that ACI 318-02 allows the ϕ factor to increase for any level of tensile strain above yield strain (fy/E_s) which is typically a value of 0.002. This is the equivalent of ρ_b. Older versions of ACI 318 stipulated that ϕ could begin to increase at nominal axial capacities corresponding to the lesser of $\phi\rho_b$ or $0.10f'cA_g$. Most often, the $0.10f'cA_g$ would control thus providing a "bulge" of added flexural capacity corresponding to the lower axial loads of the typical interaction curve. Since the ACI 318-02 enables an increase in the ϕ factor that begins at net tensile strains of 0.002, the "bulge" of added flexural capacity is significantly larger than that of earlier ACI 318 codes (see Figure 1).

In this world of ever increasing complexity and ambiguity regarding the design and construction process it is refreshing to find that code developers are taking steps toward unification. The adoption of ASCE 7 load combinations by ACI is a change that should to some degree simplify our lives as structural engineers.

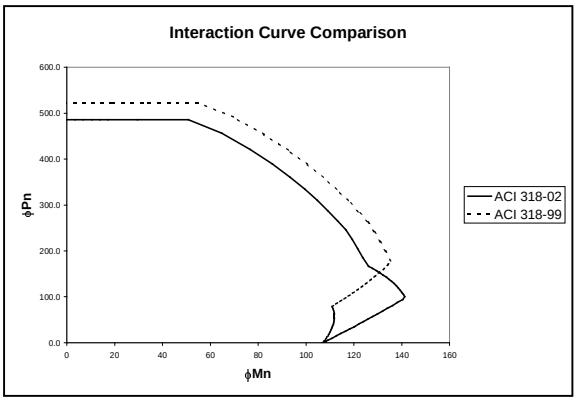


Figure 1 – Interaction Curve Comparison

BULLETIN BOARD

SEAU ANNUAL GOLF TOURNAMENT

The SEAU Annual Golf Tournament was held on Thursday, September 18, 2003, at the Rose Park Golf Course. It was a beautiful afternoon and a good time was had by all. Thanks to Dave Pierson for organizing this event. Dave announced the results at the Fall Social.

First Place Team:
Troy Dye (ARW)
Barry Arnold (ARW)
Chris Hofheins (BHB)
Patrick Alcorn (BHB)

Second Place Team:
Tad Goaslind (Simpson Strong Tie)
Gary Pugmire (Simpson)
Ron Dunn (Dunn Associates)
Dave Pierson (ARW)

Longest Drive : Gary Pugmire (Simpson)
Closest to the Hole: Lara Blum (ARW)

SEAU MEMBERSHIP DUES

Have you received your membership dues notice? If not, please contact Jeff Miller at 486-3883 or jmiller@reaveley.com. Dues must be paid by the end of October to be counted on the official roll of SEAU. The current year membership directory will be published based on this list. Payments can be sent to SEAU's mailing address shown on the last page of the newsletter.

If you have changes to make to your contact information, please send changes to Craig Wilkinson at 486-3883 or cwilkinson@reaveley.com.

SEAU EMAIL SUBSCIBER LIST

To register for SEAU announcements and the newsletter via email please visit: http://mailman.xmission.com/cgi-bin/mailman/listinfo/seau_members

If you have a new email address you can register it on this site to insure you keep receiving notices and newsletters.

SEAU's new web page manager is Jake Watson. He has taken over for Dave Cassett, who has moved on to pursue a graduate degree at MIT. We would like to thank Dave for his invaluable efforts in getting the SEAU web site up and running and managing it up until this past August. If you have web site questions, please contact Jake at 328-2726 or jake@ckengineers.com.

SEAU FALL SOCIAL

Thanks to our board of directors and particualry SEAU President, Ron Dunn, for putting together a very nice opening social banquet.

If you, for whatever reason, were not able to pay for your guest when you arrived, please send payment to SEAU to the post office box address on the last page of the newsletter.

We are all looking forward to a successful year for our association.

SEAU Fall Social at Hidden Valley Country Club

CLASSIFIEDS

STRUCTURAL DESIGN ENGINEER

Reaveley Engineers & Associates, Inc. has a position available for a self-motivated structural engineer. If you enjoy working on challenging projects using state-of-the-art-engineering solutions, have reasonable verbal and writing skills, and want to learn new methods to solve problems, we would like to hear from you. Projects may include new construction or renovation of existing buildings, seismic base-isolation, Buckling-Restrained or Eccentric Braced Frame systems, and Linear Dynamic, Non-Linear Static (push-over), or Non-Linear Time-History seismic analysis procedures. A masters degree is preferred (but not required) in civil engineering (structural emphasis). Send resume to:

Reaveley Engineers & Associates, Inc.
1515 South 1100 East
Salt Lake City, Utah 84105
Attn: Parry Brown

Phone: (801) 486-3883
Fax: (801) 485-0911
e-mail: pbrown@reaveley.com

BULLETIN BOARD

Structural Engineers Association of Utah sponsors:

Planning and Procedures for Post-Disaster Structural Evaluations

THURSDAY, OCT. 16, 2003
AT THE
University of Utah,
Ray Olpin Union Bldg.
220 S. Central Campus Dr. (1595 E.)
Salt Lake City, UT

STRUCTURAL ENGINEERS ASSOCIATIONS
SEA
NATIONAL COUNCIL
SEER

COURSE SCHEDULE

8:00	9:00	*Registration / Cont. Breakfast*
9:00	10:45	SEERPlan
10:45	11:00	*Break*
11:00	11:50	ATC-20 Introduction
11:50	1:00	*Lunch*
1:00	1:45	Seismic Assessments
1:45	2:00	*Break*
2:00	2:50	Non-Seismic Assessments
2:50	3:30	Examples / Misc. Topics

Emergency preparedness is no longer just an issue for the West Coast where an earthquake could occur at any time. The constant potential for natural disasters and the increased threat of terrorism are a nation-wide phenomena. California and Washington States have had procedures for emergency structural evaluations in place for quite some time in case an earthquake strikes. On the other hand, emergency engineering assessment teams were quickly assembled for the first time after the World Trade Center attacks in New York City.

Structural engineers and architects are needed to assist governments and other agencies after an emergency. In order to respond to this need, the National Council of Structural Engineers Association (NCSEA) formed the Structural Engineering Emergency Response (SEER) Committee. Over the past year, the committee has prepared a manual, SEERPlan, which was released in April 2003. The SEERPlan was created to serve as a blueprint for State SEA's seeking to establish emergency assessment groups or to update existing plans.

The Structural Engineers Association of Utah is sponsoring a one-day seminar to train engineers and architects for emergency building assessments. Seminar topics will include an overview of the SEERPlan and how it is being implemented in Utah, ATC-20 structural assessment training for earthquake damaged structures, and expanded structural assessment training to include damage caused by tornados, fire, and explosions.

The goal of the seminar is to train a core group of engineers, architects, and building officials for response to an emergency if requested by local governments or agencies.

ATC-20, Procedures for Post earthquake Safety Evaluation of Buildings, and the *ATC-20-1 Field Manual* will be provided at the seminar.

INSTRUCTORS:

August W. Domel, PhD, PE, SE
Principal—Engineering Systems Inc.
NCSEA SEERCommittee Chairman

Chad R. Fischer
Consultant-Engineering Systems Inc.
NCSEA SEERCommittee Secretary

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For further information, contact
Barry H. Welliver
553-0162
E-mail barrywelliver@earthlink.net

Registration Deadline: Oct. 11, 2003

Name
Address
City, State, Zip
Phone
Fax and/or Email

Fax, mail, or call SEAU office to register

Price		
SEAU Member	☐	$35
Non-member	☐	$75
Student	☐	$10

Lunch may be purchased at the food court.

Parking available in lot for fee.

SEAU Presents:

STRUCTURAL ENGINEERING EMERGENCY RESPONSE SEMINAR

Date: Thursday October 16, 2003

Time: 8:00 a.m. – 3:30 p.m.

Instructors:
August W. Domel, PhD, PE, SE, Principal – Engineering Systems Inc., NCSEA SEER Committee Chairman
Chad R. Fischer, Consultant-Engineering Systems inc., NCSEA SEER Committee Secratary

Panorama Room
University of Utah Union Building

Registration Deadline: October 11, 2003, - see attached registration sheet.

Parking: Pay lot is available east of the Union Building

Lunch is on your own. There is a large cafeteria with several different food vendors in the Union Building Lower Level.

Cost: $35.00 for current SEAU members

Topics covered include an overview of the SEER Plan and how it is being implemented in Utah, ATC-20 structural assessment training for earthquake damaged structures, and expanded structural assessment training to include damage caused by tornados, fire, and explosions. The goal of this seminar is to train a core group of engineers, architects, and building officials for response to an emergency if requested by local governments or agencies.

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