



SEAU NEWS

The Newsletter of the Structural Engineers Association of Utah

Volume X- Issue V February 2006

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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*Davis Conference Center
see page 2.*

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FEBRUARY EVENT

SEAU MEETING

Hurricane Katrina - A Photographic Overview

February 16, 2006 5:30PM
EMCB 103

Presented by

Robert "Doc" Moyle,
John Masek,
and Feiyue Su

MESSAGE FROM THE BOARD

SEAU Participation



By Don Barker,
Secretary/Historian

I have enjoyed being on the SEAU board this year and how it has caused me to be more involved in SEAU. It has given me a great opportunity to see how the board and the committees function. I am impressed by what the committees accomplish and the dedication of those involved. In the past, I have been one of

those SEAU members that have taken advantage of the monthly meetings but not much more than that.

It has been interesting over the 20 plus years that I have been going to SEAU activities to see who comes and who does not; especially the last couple of years. The thing that has caught my attention the most is not who comes, but who does not. A couple of questions always come to mind. If you are not attending SEAU functions, why don't you? If you work in an office where most people do not come, why don't they? Is it because it is not important to your employer? If it isn't important to your employer, ask them why? If you are a principal or owner of a structural engineering firm and you do not come, why don't you? Are we

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MEMBER FORUM

FOCUS

Salt Lake City and the greater Wasatch Front are growing into a major metropolitan region with many interesting buildings that define our historical, business and cultural qualities. SEAU NEWS will highlight some of our most interesting and important buildings over the next several months. (If you have a particular interest in a building you would like to see highlighted in this space, please contact the Newsletter Committee). This month the focus is on:



Davis Conference Center

Article by Jerel Newman S.E.

Description of the Building Program

The Davis Conference Center is a 42,420 square foot structure located in Layton, Utah. The building houses reception and conference space which is used in conjunction with adjacent hotel space on the east side of the project. The conference center was conceived in order to serve the communities of northern Utah by providing state of the art convention and reception space which features integrated presentation amenities and high-speed internet access. It provides an alternate to similar facilities established in the Salt Lake City metro area.

The architectural program included construction of the conference center and an adjacent three-story wood framed hotel. The conference center houses a grand ballroom with movable partitions which can be used to divide the space into eight separate smaller meeting spaces. The facility also houses smaller meeting rooms and reception areas which are connected by a concourse that runs the length of the facility and terminates at a steel and glass turret. The turret is

used as a reception space that joins the concourse with the corridor to the adjacent hotel.

Two 70 foot tall free standing exterior towers were incorporated into the architectural design to add interest to the front entry and to provide a distinctive landmark which can be readily associated with the facility. The towers are framed with an economical steel tube superstructure that supports a sandstone veneer which is intended to mimic the red rock topography associated with the state of Utah. A fifteen

foot tall architectural aluminum frame stands atop each tower. Aluminum was chosen for this frame component due to its corrosion resistance, light weight, and economy.

Since it's completion in the fall of 2004 the Davis Conference Center has received several honors including a 2005 Engineering Award of Excellence from the American Institute of Steel Construction, a 2005 Excellence in Masonry Design Award from the Utah Masonry Council for outstanding design and workmanship, and a 2006 Engineering Excellence Award from the American Council of Engineering Companies of Utah.



Unique Aspects of the Structural System

The conference center provided many challenges which required innovative methods to achieve the desired outcome. A large component of the overall vision for the project was to provide open clerestory windows within the concourse which are not obstructed by the presence of bracing. However, a moment resisting frame system was ruled out due to the cost and the geometry. Other challenges included; the exposed framing of the turret, designing the towers at the front entry to satisfy the architectural need for openness and distinction while

FOCUS (cont.)

complying with building code provisions, and meeting budget constraints.

Main Concourse

The main concourse roof diaphragm is significantly higher than the rest of the building. This presented the design challenge of providing lateral stability without the use of obtrusive bracing, or costly moment frames. The desired system needed to be slender, simple and economical. The ballroom and meeting rooms on either side of the concourse were framed as conventional four sided steel diaphragms with steel chevron braces. The concourse was framed separately with 8" square tube columns which support a barrel vaulted roof constructed of rolled tubes. To provide lateral stability for the concourse, steel slip collar connections were added to each concourse column at the level of the adjacent braced roof diaphragm. These slip collars were designed to transfer lateral shear forces directly from the concourse columns to the braced portions of the building on either side. The collars were designed to slip to accommodate anticipated deflections in the



adjacent roof structure from snow or live loads. In order to prevent undesirable sound transfer through the slip collars each column was wrapped with an adhesive backed elastomeric material at the connection to deaden any sound transmission. The use of this method of lateral support eliminated the need for any transverse bracing along the length of the concourse. Only minimal bracing was required in the longitudinal direction at the ends of the concourse, where the elevation difference between concourse and the adjacent roofs was the greatest. Due to the potential for slightly higher building drifts in the concourse, the clerestory window manufacturer and the contractor were consulted early on to develop the details needed to accommodate these anticipated building movements within the exterior and interior finishes.

Exterior Towers

The architectural design called for two 70 foot tall free standing towers to be constructed at the main entry. These were clad in sandstone veneer and support 15 foot tall exposed aluminum frames. The towers presented an engineering challenge due to the seismic forces generated by the weight of the sandstone veneer and the high design wind loads required by city ordinance. To design a stable framing system for the towers, three dimensional computer models were developed and subjected to the design earthquake and wind forces. The results of these models indicated that the towers could be efficiently constructed using 5 inch square steel tube segments with fillet welded connections. Metal stud infill framing and plywood sheathing provided the back-up to anchor the sandstone veneer.



Turret

The architect wanted to express the shape of the roof structure in the turret as part of the overall design. Because of this, attention was directed to forming an architecturally pleasing yet economical connection at the center of the turret. In order to accomplish this, a standard round tube was split in half and welded to the web of the main carrying wide flange beam. This formed a dramatic radiating pattern with the secondary framing members. As with the concourse, cantilevered columns were incorporated into the structure for lateral support. For economy, the wall sconces in the turret are created using typical exterior parking lot lights oriented in an upward direction. Each light weighs approximately 125 lbs and is supported by a frame cantilevered off the main building columns. This technique provides an unusual and interesting design element which blends in with the modern theme of the building.



MESSAGE FROM THE BOARD (continued from page 1)

just “card carrying” SEAU members? Or do we take advantage of our membership?

It is interesting to see that from some firms, there is usually a fair representation. While from other firms, there is little or sometimes no representation. Why is that? Why is it that in some offices SEAU is important yet in others it is not important? As SEAU members, do we only “talk-the-talk” or do we “walk-the-walk”. If you are an owner or principal of a company, I would greatly encourage you to encourage your employees to be involved. If you are an employee of a company whose owner or principals do not attend, I would encourage you not to follow their example, but instead, get involved in SEAU.

The **Structural Engineers Associate of Utah** is rated towards the top in the nation among structural engineering associations. We have great committees and a great organization. We all need to take advantage of it. If you have time, get involved on a

committee. If you do not have time, make some time. You might find that your firm is not the only firm in town that has good engineers who are dedicated to improving their engineering skills and abilities. You might also find that there are good engineers who want to make the profession better.

A good example of one of these engineers is Larry Revealey. He is one of the “senior” members of SEAU, but he is still involved. He is always willing to share his expertise and experience in bettering those around him. He has put a lot of effort and work into having great seminars and monthly programs. He is a person who is trying to make the profession as a whole better. I appreciate Larry for not “retiring” from SEAU. I enjoy rubbing shoulders with him (as well as those who come) at our monthly meetings and the enthusiasm he brings to the profession. For those of you, who have “retired” from SEAU, come out of retirement and join us.

PRESIDENTS MESSAGE – RAMBLING by JULIE OTT

Beaches in Edmonton and ski hills in Dubai. Is an engineers ability to create an anomaly in a foreign climate, limiting the need for globalization. Is the adventure of travel diminishing, or do some people just have so much money they want everything at their fingertips? Then again, perhaps some feel that the travel time of modern jets or the mothballed concord to be too long and engineer’s next feat will be a faster mode of transportation - where’s Scottie?

South Korea is constructing an 800 m cable-stayed main span bridge to the Inch’on Airport. The proposed Burj Dubai tower is estimated to be topped at over 600 m, some are estimating the final tower to be closer to 700m. Anything over 509 m would top Taipei 101 - which currently holds that title for the worlds tallest. As long as man has dreamed of bigger and better, engineers have been a key in the growth of society - we obviously have a very bright future.

As we continue to push the limits into the future, ENR and ATC are taking nominations to recognize The top U. S. seismic engineers of the 20th century (up to 10), The top seismic projects of the 20th century (up to 10), and The top seismic products (up to 10). Winners will be announced at the EERI conference in San Francisco in April. Nominees are due at the end of February, see <http://www.atcouncil.org/pdfs/CallforNominationsFinal.pdf> for additional information.

Looking thru the July 1999 ENR issue in which ENR recognized the Top 125 engineering projects of the last 125 years, the award of the top 10 seismic projects and engineers should be very exciting.

SEAU committees continue to be a flurry of activity; we hope that the additional updates in SEAU News have helped to make everyone more aware of some of the many activities. SEAU is your organization, if you have questions/comments/suggestions please contact myself, Jeff Miller, or any other of your friendly Board Members.



CONCRETE GRAVITY COLUMNS – DO ACI SEISMIC PROVISIONS APPLY? by JEROD JOHNSON

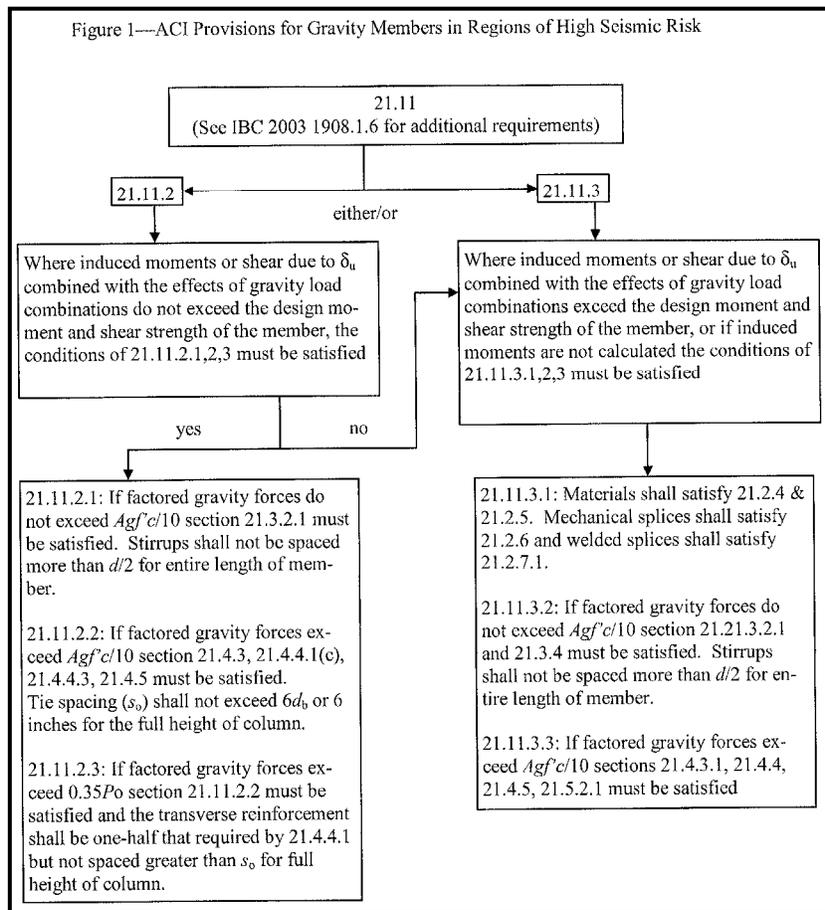
This may seem like a trivial question, but one that deals with an issue that in large measure might be overlooked. At first glance one might think; Of course not...gravity columns are designed for gravity, so why would I need to address the seismic provisions of chapter 21 of ACI 318? The answer is a simple matter of deformation compatibility. We can all appreciate that gravity load carrying members are inextricably linked to the lateral force resisting system. Though not specifically designed to provide lateral stiffness, the performance and behavior of gravity load carrying elements can be significantly altered in a seismic event. Hence, we must deal with deformation compatibility issues and ductility requirements that arise for gravity load carrying elements during a seismic event.

Let's begin by addressing this simple question; How do I know when it is required to incorporate the ACI chapter 21 seismic provisions for gravity columns? In general terms that match the ACI code language, gravity members are those "not proportioned to resist earthquake forces" mentioned in section 21.2.1.4 of ACI 318. The same section of ACI indicates that in regions of high seismic risk such members must comply with section 21.11. The next most logical question might be; what is a "region of high seismic risk" when considering the ACI requirements? Table R1.1.8.3 of ACI 318 indicates that for IBC 2000/2003 and ASCE 7-93/95 structures designated as a seismic design category A or B have a 'low' level of seismic risk. Structures in seismic design category C have a 'moderate/intermediate' seismic risk. Structures in seismic design categories D, E or F have a 'high' level of seismic risk and must therefore meet the provisions of Section 21.11 of ACI 318 (Table R21.2.1 summarizes this concept – please note the 2.11 typo, which should read 21.11 in order to be consistent with 21.2.1.4). Since most projects along the Wasatch Front fall into a seismic design category D or greater, a reasonable conclusion is that most projects in this region must adhere to ACI 21.11 for elements not proportioned to resist earthquake loads (gravity members).

So, if we conclude that the 21.11 provisions are applicable, what is the next step? Unfortunately, the design becomes much more

complex. Figure 1 is an illustration of a flow chart providing direction to the ACI Chapter 21 provisions that may be applicable. This flow chart is not complete due to limitations of space and the complexity of the code provisions, but it does provide the direction to the applicable code provisions. Essentially, these provisions provide triggers based on the levels of axial load, bending load and shear load that require the need for greater levels of seismic detailing, in some cases the same detailing as that required for members of the lateral force resisting system.

The Chapter 21 seismic provisions that are applicable to members not proportioned to resist lateral forces (gravity members) are complex and can significantly alter minimum requirements for gravity members. Among these triggered detailing requirements are: increased longitudinal reinforcement, volumetric determination of ties and stirrups, ties and stirrups along the entire member lengths, cross tie requirements and a generalized decrease in tie/stirrup spacing. A simple example of this is column ties for gravity columns. The Chapter 7 provisions for tie spacing are quite simple; 16 vertical bar diameters, 48 tie diameters, or the least column dimension. However, the Chapter 21 provisions are far more complex and may require a much tighter tie spacing



BULLETIN BOARD**SEAU – NCSEA 2006 COMMITTEE by BARRY WELLIVER****Hear Ye, Hear Ye, Tell Us All About It**

The SEAU NCSEA 2006 Committee has not finalized the speakers for the NCSEA Annual Conference this September. If you have a notable project or topic that you think would be of interest please notify me. All submittals will be judged based on uniqueness and usefulness to the engineering community.

Please submit your idea for consideration ASAP as this offer will only be available for a short time.

Submittals should contain:

- A) The project/research name.
- B) The presenter's name.
- C) The length of the presentation.
- D) A brief outline of the project/research.

Submittals should be directed to:

Barry Arnold,
NCSEA 2006 Committee Chairman
at barrya@arwengineers.com

SEAU – BY-LAWS COMMITTEE by BRENT MAXFIELD

Attached to this SEAU News are significant proposed changes to the SEAU By-Laws. This is the result of a more-than-one-year process of discussing the current SEAU By-Laws.

The Board of Directors has asked the By-Laws Committee to propose significant changes to the by-laws that would greatly simplify the way that members are admitted to the Association. We were also asked to holistically look at the by-laws and make recommended changes to improve the by-laws.

The following is a commentary on the proposed changes:

1. Add a new section giving the purpose of SEAU. Most organizations have a purpose statement at the beginning of the by-laws. The proposed purpose statements are based on statements found in other Structural Engineers Association by-laws.
2. Add a new SEAU Grade – Professional SE. SEAU is in the midst of working with several other organizations to establish a Structural Engineer Title Act in the State of Utah and in other states. We are of the opinion that the title “Structural Engineer” has value, and means that a person has been licensed and qualified to use the title. In order to put meat into what we are saying, it is critical that we as an association also place value in the title of “Structural Engineer”. Thus, we propose adding the new grade of membership. The president of the Association must now be licensed as a Structural Engineer by the State of Utah. The members of the Ethics and Professional Practice Committee must also be licensed as Structural Engineers.
3. Clarify residence requirement. This requirement was implied before, but it is now made clear. In order to be a voting grade member, you must reside in Utah and be licensed in Utah. Members

licensed in Utah, but not living in Utah will be Associate Grade members.

4. Eliminate the Grade of Fellow. This grade has never been used in the history of SEAU, nor does the Board feel that it will ever be used. In order to clean-up the by-laws, the grade is eliminated.
5. Clean-up the use of Life Grade. Much of the wording was redundant.
6. Add additional requirements to Student Grade. This grade was being abused by members who were working for member employers and attending only one or two classes. The proposed requirements are intended to prevent this abuse.
7. Simplified admission to the Association: This is the focus of the proposed changes. It is currently a very lengthy and cumbersome process to join the Association – for no apparent reason. No one has been denied membership in the association in recent memory. The proposed changes make it much faster and simpler to join the association. The changes also make it much simpler to change from Student to Associate and from Associate to Professional grade.
8. Eliminate initiation and transfer fees. Yea!
9. Simplify dues payment. The payment of dues has been a hassle for the Secretary and Treasurer for many years. The proposed changes will make the jobs of the secretary and Treasurer much easier. It is now clear, that dues notices will be sent out prior to the end of the fiscal year. Dues must be paid by the beginning of the fiscal year. You will have a two-month grace period before being charged a \$20 late fee. It is also made clear that if you do not pay your dues by July 31, you will not enjoy the benefits of membership (such as the SEAU opening social or the discount on seminars). The Board is frustrated by members who do not pay dues until a seminar is approaching and they join, just so they can have a discount at the seminar. SEAU dues are priced very reasonably, and SEAU

provides a great value. We want all members to stay active members so that they can benefit from

the purposes added to the by-laws. We have thus

SEAU – BY-LAWS COMMITTEE (cont.)

added a \$40 penalty for letting your membership lapse and then reapplying.

10. Change the way dues are paid for new members joining the association. Because of the simplified application process, dues are now paid at the time of application. The amount of dues paid when applying is also given.
11. Change to UEC delegate. Currently, the delegate to the Utah Engineers Council (UEC) is a member of the Board of Directors. This means that SEAU sends a new delegate every year to the UEC. This presents some challenges because there is no continuity from year-to-year. The proposed change eliminates the requirement that the delegate be a member of the Board. This will allow any SEAU member to serve on the UEC for more than one year. It will provide for a much-needed continuity in the UEC.
12. Allow more time for Nominating Committee. The current by-laws do not allow much time for

the nominating committee to select nominees for elections. The proposed change moves the election of the nominating committee forward one month.

The proposed changes are extensive. Please read them carefully. We seek your input. If you agree with them – let us know. If you disagree with any of them – let us know. Are there other parts of the by-laws that need to be addressed? We would like to have a thorough dialog in the March Newsletter. In order to do so, we need your comments. Please send your support or suggestions to the by-laws committee or to a member of the Board. Following your input, the Board of Directors will vote on the proposed changes in April, and they will go to the membership for voting in May.

UTAH ENGINEERS COUNCIL BANQUET

The Utah Engineers Council will hold its annual banquet on Thursday, February 23rd. This year’s speaker will be Stan Checketts, founder & CEO of S&S Worldwide, a leading manufacturer of family thrill rides and roller coasters. Please see the SEAU website for ticket information, time, and location.

CALL FOR NOMINATIONS

The Applied Technology Council (ATC) and Engineering News Record (ENR) are seeking nominations for awards recognizing the top seismic engineers, projects, and products of the 20th century (up to 10 in each category). The awards will be presented on April 17, 2006 in San Francisco at the ATC-ENR Awards Dinner, *Celebrating 100 Years of Seismic Structural Engineering and Construction in the United States*.

Nominees are sought for three categories:

- The top U. S. seismic engineers of the 20th century (up to 10)
- The top seismic projects of the 20th century (up to 10)
- The top seismic products (up to 10)

Nominations may be submitted by individuals or organizations. For further information on making a nomination or obtaining tickets to the awards dinner, please see the SEAU website.

SEAU MEMBERSHIP APPLICANTS

The following individuals have submitted an application for approval by the SEAU membership committee for new members:

Jeff Reid – Affiliate

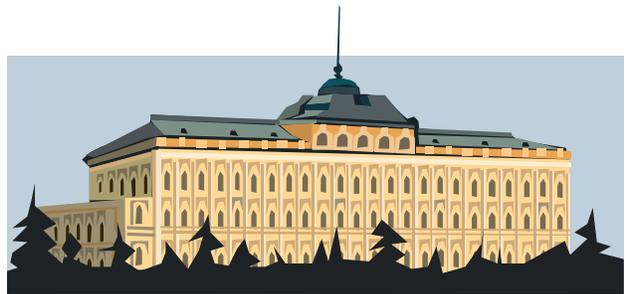
ADVERTISEMENT

Structural/Civil Engineer

We are looking for an experienced Structural/Civil Engineer with a desire to do more than just sit in the office all day! Structural concrete products design experience and P.E. registration preferred.

Duties include precast concrete design work and cost estimating, along with close involvement with clients and the production staff for each project. Being involved from start to finish leads to a very exciting work environment and a rewarding experience! Good computer skills, written/verbal skills, and unique problem solution skills are very helpful for this position. Benefits include a company car, insurance, and competitive wages!

Fax resume to EnCon Utah at (435) 843-4239, or call Glen Palmer at (435) 843-4230 or (800) 578-9773.



SEAU Presents:

Hurricane Katrina A Photographic Overview

February 16, 2006

5:30 PM

Engineers & Mines Classroom Building

EMCB 103

University of Utah Campus

Presented by

Robert "Doc" Moyle - ARW Engineers, an initial responder for the National Guard

John Masek - ABS Consulting & ASCE Technical Member

Feiyue Su - ABS Consulting, four month structural evaluator for FEMA

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