

SEAU NEWS

The Newsletter of the Structural Engineers Association of Utah

Volume XII- Issue I September 2007

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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SEAU FALL SOCIAL

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SEPTEMBER EVENT

SEAU FALL SOCIAL

September 14, 2007

6:00 pm – 9:00 pm

Energy Solutions Arena
Jazz 100 Club

Free for current SEAU Members.
All others \$30.00.

RSVP by Tuesday September 11th

See page 10

MESSAGE FROM THE BOARD

THE COMING YEAR



By Barry Welliver,
SEAU President

Welcome to the new SEAU year. I'm excited about where this organization is headed and want to share with you some of the plans we have in store.

First however, I'd like to express my thanks to outgoing board members

Don Barker, Michael Buehner and past president Julie Ott. Many of you probably already know what kind of time commitment is involved when you agree to being a part of the board of direction for SEAU. It seems like there never is enough time to do everything and when the day is done, it's sure nice to feel like something was accomplished. Each one of these individuals has helped SEAU "kick it up a notch" and when you see them at our functions, let them know it was worth their effort.

I moved to Utah from California with my family in 1995. While I still maintained my structural practice in California, establishing a new office here brought many challenges. One of my first interests was to join SEAU

CONTINUED ON PAGE 6

Opinions expressed in the SEAU Newsletter are not necessarily those of the Structural Engineers Association of Utah. Technical information contained herein shall not be used without independent verification by an engineer. Advertising rates and information sent upon request. Acceptance of advertising and informational brochures in the SEAU Newsletter does not constitute endorsement or approval by SEAU of the products or services advertised. SEAU reserves the right to refuse any advertising or editorial comment.

SEAU OFFICERS FOR 2007-2008

SEAU Board Members for the 2007-2008 Year

Office	Board Member	Telephone
President	Barry Welliver	(801) 796-0590
President Elect	Glen Palmer	(801) 843-4230
Past President	Jeff Miller	(801) 486-3883
Treasurer	Russell Merrill	(801) 575-8877
Secretary/Historian	Chris Kimball	(801) 535-7751
Board Member	Shaun Packer	(801) 466-1699
Board Member	Cliff Cole	(801) 298-1118



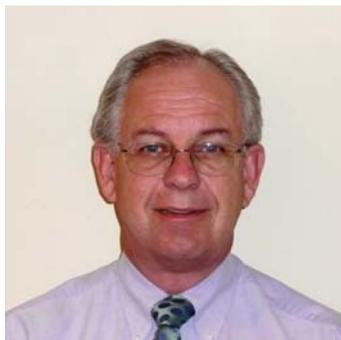
Barry Welliver
President



Russell Merrill
Treasurer



Shaun Packer
Member of the Board



Glen Palmer
Vice President/President Elect



Chris Kimball
Secretary/Historian



Cliff Cole
Member of the Board

SEAU COMMITTEES

Looking for a way to make a difference? Contact any of the 2007-08 SEAU Committee Chairpersons listed below and get involved!

Programs	Julie Ott & Chandra Clyde (801) 333-7676	Audit	Jeremy Achter (801) 782-6008
Seismic	Stephen Cohen (801) 328-2726	Membership	Brandt Saxey (801) 575-8877
Codes	Mark Harris (801) 486-3883	NCSEA	Barry Arnold (801) 782-6008
Legislative	David Brown (801) 943-5555	PR-Web Page	Chris Hoffeins (801) 335-5656
Newsletter	Richard Seelos (801) 486-3883	Emergency Response	Blake Hoskisson (801) 523-7080
By-Laws	Brent Maxfield (801) 240-1529	Residential Design	Scott Wilson (801) 466-1699
Structural Licensing	Kelly Calder (801) 328-2726	Existing Buildings	Barry Welliver (801) 553-0162
BSSC	Parry Brown (801) 486-3883	PR-Web Page	Chris Hoffeins (801) 335-5656
Professional Practices & Ethics/Standard of Care	Ron Dunn (801) 575-8877	Emergency Response	Blake Hoskisson (801) 523-7080
UEC Delegate	Shaun Packer (801) 466-1699	Residential Design	Scott Wilson (801) 466-1699
USSC	Jake Watson (801) 328-2726	Existing Buildings	Barry Welliver (801) 553-0162

2008 SEAU NEWS ARTICLE DEADLINES

<u>DATE</u>	<u>BOARD ARTICLE</u>	<u>COMMITTEE ARTICLE</u>	<u>DEADLINE</u>
September	President	Membership Programs Newsletter	Aug. 30 th
October	President Elect	NCSEA Representative Seismic Structural Licensing	Sep. 27 th
November	Treasurer	Codes Emergency Response USSC Representative	Oct. 25 th
December	NEWSLETTER NOT ISSUED		
January	Senior Board Member	Existing Buildings Legislative Seismic	Dec. 13 th
February	Secretary / Historian	By-Laws Codes PR-Web Page	Jan. 31 st
March	Past President	Emergency Response Residential Design UEC Delegate	Feb. 28 th
April	Junior Board Member	BSSC Professional Practice and Ethics Seismic	Mar. 27 th
May	President	Codes Newsletter	Apr. 24 th

TECHNICAL ARTICLE by JESSE MALAN**Concrete Cantilevered Retaining Walls Part 1**

This month's article is the first part of a three part installment on the design of cantilevered concrete retaining walls. There are very few complete design procedures on how retaining walls should be designed. However, there are specific considerations that ought to be included for a competent, sound design.

Forces

Figure 1 illustrates the forces that can be found acting on a cantilevered retaining wall. As engineers, we should be aware of all of these loads in our design.

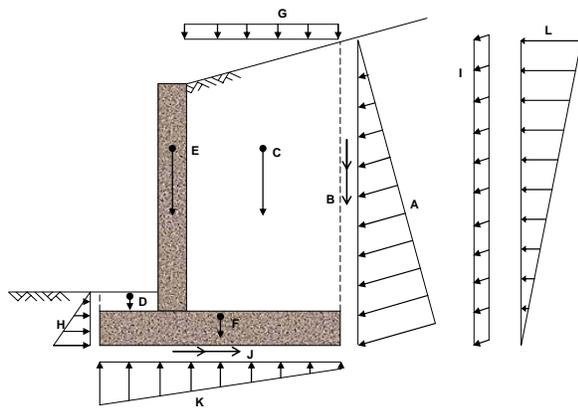


Figure 1: Basic Forces and Loads

- A. Lateral earth pressure on free body diagram.
- B. Frictional force from soil to soil interaction from the back of the heel along a vertical plane to the retained soil surface. (Activates only if soil tries to uplift.)
- C. Weight of the soil above the heel of the footing.
- D. Weight of the soil above the toe of the footing (Typically neglected).
- E. Weight of the stem wall.
- F. Weight of the footing.
- G. Any surcharge or overburden on the soil above the heel of the footing.
- H. Passive earth pressure on the front face of the toe and the soil above the toe. (This force is often neglected because the soil may not have been in place when the wall was first loaded and it is a conservative approach.)
- I. Lateral earth pressure due to overburden pressure (G).
- J. Frictional force on the base of the footing.
- K. Bearing pressure or force of the soil to the footing.
- L. Increased lateral earth pressure due to seismic considerations. (This will be discussed in more detail next month.)

Stability – Sliding

Sliding is the lateral translation of a wall due to the lateral forces. Sliding failure is caused by inadequate resistance to lateral forces at the base of the wall. Some

design resources such as the CRSI Design Handbook suggest that if the resisting forces for sliding are not adequate then a shear key may be added to a wall. A shear key is a vertical, lengthwise downward projection from the heel of the footing. Some engineers believe that this key is not very useful as the length of the key projection only increases the overall depth of the wall in the earth thereby increasing the lateral forces acting on the wall.

Stability – Overturning

Overturning is the rotational translation of the wall, footing, and soil above the footing about the toe of the footing. This failure mode exists when the sum of the overturning moments is larger than the sum of the resisting moments about the toe of the footing. Due to the soil lateral forces on the wall, only C, D, E, F, and G from Figure 1 are available to resist the overturning moments (as long as D and G can be considered permanent). B can be used as well but would require the wall to begin to overturn and thus is typically neglected.

Stability – Soil Bearing

Bearing stability is the ability to resist punching or penetration into a soil. Due to the lateral and vertical forces acting on the wall, the soil pressure at the base is not evenly distributed. It is common practice, but not required, to limit^(b) this eccentricity to the middle one third of the base so that the entire footing width is effective in bearing resistance. The soil pressure is usually the greatest at the toe of the wall.

Stability – Soil Shear

Figure 2 depicts Soil Shear Failure which is an external failure of the designed wall where the soil surrounding the wall loses shear resistance and rotates. Although this failure mode is of concern for overall design, it is generally not considered by the structural engineer for retaining wall design. This type of failure should be checked by the geotechnical engineer. For relatively short walls, soil shear is generally not a concern.

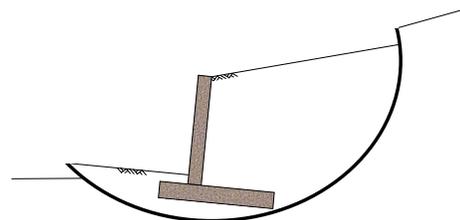


Figure 2: Soil Shear Failure

Servicability – Settlement & Deflections

It should be noted that the retaining wall needs to rotate to develop the active pressure behind the wall and the passive in front. The footing will experience some

TECHNICAL ARTICLE (cont.)

settlement due to the bearing load, more at the toe than at the foot. The concrete wall and footing will see some initial deflection and long term creep due to the applied forces. If the deflection is critical, settlements & wall/footing elastic deflections should be taken into account but can be very difficult to determine.

Considerations

Since properties can vary greatly between different soils (for example those used in design of the wall, and those actually placed by the contractor), it is of importance to obtain soils information when possible from a local geotechnical engineer to find out exactly what type of soil will be used as backfill. Compaction of the backfill can also significantly increase the lateral earth pressures acting on the wall. In summary, the geotechnical engineer should provide all soil pressures as much as possible.

Drainage methods on the earth resisting side of the retaining wall is also of high importance. The hydrostatic pressure caused by trapped water can dramatically increase the lateral pressure on the wall. Typical methods for drainage include: weep holes at about every 10 ft., a French drain of gravel about a foot thick for most or all of the earth resisting side height, a porous pipe drainage system along the base of the wall, or any combination of these. The drainage system for a retaining wall should be examined carefully to keep water away from footings bearing on collapsible or expansive soils.

Factors of Safety

Table 1 shows the code-required and other recommended factors of safety for sliding and overturning from various sources which represent minimums under service loads. The range on Bowles^(b) is used based on the importance of the wall.

Table 1: Factors of Safety

	Sliding	Overturning
IBC 2006 [1806.1]	1.5	1.5
CRSI 2002 [Chapter 14]	2.0	1.5
Bowles [Section 12-6]	1.5 – 2.0	1.5 – 2.0
Handbook ^(a)	-	1.5

Closure

The majority of this article was taken from the Bowles text. This article was not meant to be a descriptive design but a guideline of considerations for use in retaining wall design. The newsletter committee invites and welcomes any comments on this article.

References

- Merritt, Frederick S., "Standard Handbook for Civil Engineers, Second Edition," McGraw-Hill, 1976
- Bowles, Joseph E., "Foundation Analysis and Design, Fourth Edition," McGraw-Hill, 1988

MESSAGE FROM THE BOARD (continued from page 1)

and learn about the practice of structural engineering here. I joined the seismic committee and remain a member of that committee today. What I have learned over the years, is that although we may be relatively small in numbers, the devotion to the founding principles remains very strong. There is uniqueness to this state both in how we practice our profession and how we lead our lives.

As some of you may already know, I have a passion for existing buildings. I think this area interests me so much because it takes a great amount of engineering judgment and ingenuity to solve the problems associated with repairs and seismically retrofitting these structures. This year we hope to have seminars on ASCE 41 "Seismic Rehabilitation of Existing Buildings" and the International Existing Building Code (IEBC). As an organization, we should express our opinion about the need to address the huge inventory of unreinforced masonry (urm) buildings. This will mean support for such measures as creating inventories of these buildings at the state level as well as helping to educate the residential urm homeowner who likely will be displaced in even a moderate

earthquake in our state. We have the knowledge about this danger, now is the time to find ways to help influence a better result.

The structural licensing committee will be pursuing legislation to create a structural practice act in our state. This important effort is poised to be presented in the January 2008 legislative session by Senator Fred Fife. Without a doubt, this will place SEAU as a proponent for the importance of structural engineering in the design of buildings and structures. The scope of this law will be fleshed out in the next several months and I hope you all take an active interest in shaping this effort.

We will be revisiting the snow load study done by SEAU some years ago to see if an update is appropriate. ASCE 7-05 offers some guidance, but here again is an opportunity to learn and create a professional opinion about how to design for the "Greatest Snow on Earth".

SEAU has been very active in collaboration with the Utah Seismic Safety Commission (USSC). This past year we assisted in writing a portion of a Utah version

MESSAGE FROM THE BOARD (cont.)

of the USGS publication “Putting Down Roots in Earthquake Country”. This will hopefully be published later this year or early next year. Additionally, SEAU lent support to efforts to inventory Utah schools and unreinforced masonry buildings for seismic safety. Our memorandum of understanding with USSC has caused them to view our organization as a fourth constituent of Utah’s State Earthquake Program (together with the Department of Emergency Services and Homeland Security, University of Utah Seismograph Stations, and the Utah Geological Survey). This is indeed an honor, and one I trust we will live up to.

We encourage your involvement in SEAU, because it’s here to represent you. The opportunities are only limited by our energies and I hope if you’ve been

lurking on the sidelines you’ll choose now to become active. Each board member and committee chair is available to help you in any way we can.

Lastly I’d like to invite you to our Fall Social. This year we will gather at the Jazz 100 Club atop the Energy Solutions arena. There will be a short tour available of the facility beforehand so you can get a chance to go into areas you may not have been (except locker rooms). We’ll also have humor columnist Robert Kirby speak and a dinner and view of the city worthy of your effort to attend.

I’m looking forward to this year and I hope that you are too.

SEAU MEMBERSHIP APPLICANT

The following individuals have submitted applications to the SEAU membership committee for new members:

- Gregory McCombs Professional
- Brad Ellis Associate
- Douglas Bennion Associate
- Craig Parker Associate
- Zach Hansen Associate

SEAU NEWS SUBMITTAL DEADLINE

October SEAU News deadline is September 27th.

- We expect updates from the following:
- Board Member - President Elect
 - NCSEA Representative
 - Seismic Committee
 - Structural Licensing Committee

BULLETIN BOARD

SEAU – MEMBERSHIP COMMITTEE by BRANDT SAXEY



I remember, as an engineering student, speaking with a couple of good friends of mine who were medical students. I noticed how their schooling had trained them to respond to every question about the medical profession with “WE”. If I asked them about brain surgery, they would respond “WE can do this and that...” If I asked them about cancer, the response was something like “today WE can cure most types of cancer if caught early enough.” In fact, if I were to ask them about any medical advancement, whether in their particular field of study or not, the response would come “in the past these things would ... but today WE can solve these problems.”

At first it seemed odd to hear them associate themselves with every different field of the medical profession, but as I thought about it, it began to grow on me. No, I do not plan to tell the next architect I speak with that “WE

have made great strides in the field of Mechanical Engineering over the past 20 years”, but I did admire the unity they had in their profession. Their educational system had, by design, put them in contact with experts in their fields, mentored them, and given them a sense of personal ownership in the achievements and successes of their entire profession. It seemed to empower them with confidence and surety.

While my university days are over now (for the most part at least), I still remember fondly the unity I saw in their profession. This is the type of experience that organizations such as SEAU can provide to their members.

On the non-technical side, SEAU gives us the opportunity to associate, in a non-work environment, with other structural engineers from our area. At the monthly meetings, we have the opportunity to talk with members from all different areas of our profession: small firms, large firms, consultants, academia, government and so on. We get the opportunity to discuss our problems and our successes – to find out what is “going on” in the profession outside of our limited realm.

SEAU – MEMBERSHIP COMMITTEE (cont.)

On the professional side, SEAU gives us the opportunity to keep up-to-date on the technical aspect of the profession from leading experts in the field. Aside from the historical and technical articles provided in the monthly newsletter, SEAU members are provided with technical seminars at each monthly meeting. As I think back on the events of last year's SEAU meetings, I am astonished at the substance and relevance of the information that was provided to SEAU members at little or no cost. I have listed the ones I can remember below:

1. Performance-Based Seismic Design of Structures – Dr Subhash Goel
2. ACI Concrete Anchorage Seminar – ACI 318 Appendix D
3. Seismic Performance and Design Requirements for High-Rise Buildings – Joe Maffei, S.E., Ph.D
4. Analysis of Revisions to the 2006 IBC – Dr. S.K. Ghosh
5. Sustainable Design: Structural Relevance – David Ericksen
6. New Non-Destructive Techniques for Structural Evaluation – Dr Paul Tikalsky

7. AISC Seismic Design incl. AISC Seismic Design Manual
8. AISC Steel Design incl. AISC Steel Design Manual

When considering the context of the presentations listed above, and the expertise of the presenters themselves, the technical content of the SEAU meetings alone would be worth the cost of membership many times over.

Last year was my first year as a member of SEAU and I was pleasantly surprised at the return on my investment. SEAU provides its members with a medium to interact with and learn from engineers from all aspects of the structural engineering profession. It binds us, as engineers, together making the “whole” greater than the sum of the parts. I encourage all SEAU members to continue to make membership an important part of their engineering profession, and invite those who are not yet members to join with us in an endeavor that will enrich your professional career in so many ways.

SEAU – PROGRAMS COMMITTEE by JULIE OTT

SEAU is looking forward to another great year filled with excellent programs to meet your needs. The Fall Social, hosted this year by SEAU President Barry Welliver, will kick off the year and is an event not to be missed. Mark your calendar and send in your reservation today! And while you are at it – be sure to mark out the **third Thursday of each month** for the regular monthly meeting seminars.

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Currently the representatives of the Programs Committee are Larry Reaveley, Chandra Clyde, Ken Petersen, and Julie Ott. If you would like to join the committee, please contact any of the above. Also, if you have specific seminars or programs you would like to see, please let us know. We strive to provide seminars you will be interested in, want to attend, and are beneficial to our profession. SEAU will again be using the DOPL Education money to sponsor seminars at a reduced rate. Everyone should be sure to take full advantage.

We look forward to seeing everyone at the Social and the monthly programs!!

SEAU – NEWSLETTER COMMITTEE by JEROD JOHNSON

As members of the SEAU Newsletter committee we have made a sincere effort to provide a quality monthly publication that we hope is deemed useful and informative by the general body of SEAU. Over the past several years the style, format and distribution of the newsletter has changed. You likely recall receiving a hardcopy of the newsletter by mail. The electronic distribution of the newsletter has not only increased the ease, speed and convenience of distribution, it has saved the organization hundreds if not thousands in printing and postage costs. We sincerely thank all who have helped with content and wish to convey the

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compliments of many who have provide positive feedback regarding the newsletter and its effectiveness.

In years past, feature articles have highlighted everything from Olympic Venues to educators who have helped to improve the profession statewide. In addition, the newsletter has provided a forum to enable the SEAU membership to learn about other engineers and firms within the body of our organization. For this year's newsletter, we plan to continue this tradition by providing member firms the opportunity of a newsletter highlight.

The SEAU newsletter committee will be reviewing the membership and may be contacting you/your firm. We hope those contacted will be willing to provide a snapshot of their organization so that the rest of SEAU may come to know your firm and the services you provide.

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We are seeking a Field Sales Engineer.

Your focus is on the education of product design to architects and the engineering community as well as current and prospective customers. This position participates in the growth of Hilti by providing competent recommendations to engineers and architects on specific applications using sound engineering judgment.

Responsibilities include providing technical support to Hilti's sales force and customers consistent with market strategy. This includes offering professional educational seminars, presentations, and testing details informing the customer of Hilti products, their performance characteristics, applications, and product limitations. This position will have direct

contact with sales people or strategic business personnel to assess application problems and opportunities.

The successful candidate will have a high energy level, be willing to work in a fast-paced environment and must enjoy working with a variety of customers (engineers, architects and contractors).

Successful candidates will receive a competitive salary, aggressive bonus plan, full benefits including a generous 401k plan plus a company vehicle.

See our website for details and requirements. Please apply at www.us.hilti.com under the Careers tab or email resumes to andrea.jones@hilti.com or fax them to (918) 461-6675.

UPCOMING EVENTS

September 14, 2007

SEAU Fall Social at Energy Solutions Center in Salt Lake City. See page 10 for additional information.

September 35, 2007

NCSEA Web Seminar. 11:00 am -12:30 pm. Dr. W. Gene Corely, Ph.D., P.E. Senior Vice President of CTLGroup in Skokie, Illinois will be directing a seminar on Thorough Preparation of Construction Documents. See seau.org for further information.

November 4-9, 2007

The Third Structural Engineering World Congress - 2007 (SEWC 2007) will be held in Bangalore, India. Please contact info@sewc2007.org for further info.

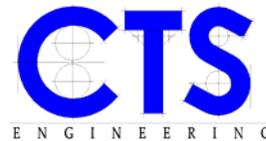
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The Church of Jesus Christ of Latter-day Saints has an opening for an experienced Structural Engineer to work in the Architecture and Engineering Division of the Physical Facilities Department. The position involves work with projects such as temples, meetinghouse facilities, Welfare Services facilities, and CES facilities.

A job description and qualification requirements can be found on the Church website at www.lds.org/emp.

ADVERTISEMENT



CTS Engineering, an enterprising structural engineering firm seeking engineers for building structures. CTS is located in Holladay, Utah. Minimum two years experience, EIT required; PE and or MSCE a plus. A successful candidate will be: adept in structural aspects of IBC and ASCE7-05 and have the ability to perform all or a portion of the gravity and lateral (seismic and wind) calculations for a variety of building structures in accordance with the applicable building codes and engineering code of ethics; possess the ability to transfer results of calculations to redlines of plans and details; pay attention to detail; have working knowledge of PCs, and excel spread sheets. This is a terrific growth potential for a self motivated hard working individual.

Holladay is located at the base of the Wasatch Mountains, just five minutes north of the Cottonwoods Canyons. World class skiing, hiking, mountain biking, and climbing are only 15 minutes away. Come join our firm and work hard and play hard; this is a great opportunity for a conscientious hard worker. Medical, holidays, profit sharing and personal time; along with a highly competitive salary. CTS is a growing forward thinking company. Email resumes to joe@ctsengineering.net, and visit our website @ www.ctsengineering.net to learn more about our terrific company.

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ENGINEERING RESULTS AT A NEW LOCATION

Don Barker, Chris Hofheins, and Jay Miller embarked on developing BHB Consulting Engineers back in 2002. Since their beginning, they have worked in small office spaces. Five years later, they have 22 employees, have provided structural engineering for over 1250 projects, and assisted with over \$1 billion in construction. The time has finally come to create a home all their own.

BHB is pleased to announce the grand opening of their new office building located on 2766 South Main Street in South Salt Lake.

BHB Consulting Engineers moved into their new office building in July. New headquarters will allow for continued company growth and service to their clients. With the move to the new office, BHB will be able to accommodate a larger structural engineering staff to further provide **ENGINEERING RESULTS**.

The new 6,600 square foot office showcases exposed structural elements highlighting what BHB does best. Elements include textured concrete tilt up panels, open web steel floor and roof joists, and an architectural finished interior concrete wall in the front lobby and conference room.

On their fifth anniversary, BHB Consulting Engineers would like to invite you to a celebration.

Happy Anniversary BHB!

Join BHB September 21, 2007 for an Open House celebrating their new office.

BHB CONSULTING ENGINEERS
2766 South Main Street
Salt Lake City, Utah 84115
Food & Refreshments ~ 3:00 to 7:00 P.M.

RSVP September 10, 2007
Telephone: 801.355.5656
www.bhbengineers.com

5 YR
ANNIVERSARY



BHB consulting
engineers

SEAU Presents:

FALL SOCIAL

September 14, 2007

6:00 to 9:00 PM

Energy Solutions Arena

Jazz 100 Club

301 West South Temple, Salt Lake Cit

Cost: \$0.00 for current SEAU members. All others \$30.00.
RSVP to 553-0162 no later than Tuesday, September 11, 2007.

A tour of the Energy Solutions Arena will be available beginning at 6:00PM. Enter through doorway #5 on the northeast corner of the building.

Humor columnist Robert Kirby will be our guest speaker.

Come enjoy dinner and a wonderful view of downtown Salt Lake City.



STRUCTURAL ENGINEERS ASSOCIATION OF UTAH

P.O. Box 581292

Salt Lake City, Utah 84158-1292

www.seau.org



Board of Directors

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