



SEAU *NEWS*

The Newsletter of the Structural Engineers Association of Utah

Volume XI- Issue III November 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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Gustave Eiffel

a French engineer and architect and a specialist of metallic structures
see page 2.

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NOVEMBER EVENT

DR. PAUL TIKALSKY

New Non-Destructive Techniques for Structural Evaluations

November 16, 2006
5:30 PM
EMCB Room 103, U of U

See page 8

MESSAGE FROM THE BOARD

WHAT CAN YOU DO?



By Don Barker,
SEAU Treasurer

SEAU has recently finished its membership enrollment for 2006 - 2007 year. As of the time I am writing this, SEAU has 263 members; 198 licensed professionals,

52 associates, 5 affiliates, 6 students, 19 life members, 2 honorary members. It is an impressive number, especially when compared to other states' structural engineers associations.

I often ask myself, "What are the purposes, goals and reasons people become members of SEAU? I am sure there are many. The SEAU By-Laws list ten purposes why SEAU was established. Do any of these purposes match yours? Some of the purposes stated in Article I of SEAU By-Laws are:

- 1- To encourage improvement and promote excellence in the practice of structural engineering among its membership and the engineering community at large.

CONTINUED ON PAGE 4

FOCUS

SEAU NEWS intends to highlight some of our most interesting and important buildings in Utah. We also wish to provide biographies of famous structural engineers.

If you have a particular interest in a building or person you would like to see highlighted in this space, please contact newsletter committee member Cameron Empey at (801) 486-3883 or cempey@reaveley.com.

This month the focus is on:



Gustave Eiffel

As indicated in the heading of this article, this year we are going to include articles on famous engineers that have contributed to the engineering community in some way. The article this month is on Gustave Eiffel. He was a well known structural engineer in the late 1800's. The following is an excerpt from the online encyclopedia Wikipedia. For the full article please see Wikipedia. http://en.wikipedia.org/wiki/Gustave_Eiffel

Alexandre Gustave Eiffel (December 15, 1832 – December 27, 1923) was a French engineer and architect and a specialist of metallic structures. He is famous for designing the Eiffel Tower, built 1887-1889 for the 1889 Universal Exposition in Paris, France, and the armature for the Statue of Liberty, New York Harbor, USA.

Early life

Eiffel was born in Dijon, Côte-d'Or, France. His mother's coal business provided ample income for the family and provided the funds for Gustave to receive higher education at the Ecole Centrale des Arts et Manufactures in Paris, where he studied chemistry. Upon graduation, Gustave was to take over his uncle's rubber cat-nip mouse factory. However, a family dispute over the quality of the rubber removed that opportunity, and Eiffel soon accepted entry-level

employment with a company that designed railway bridges.

Charles Nepveu provided Eiffel with his first job as one of many project managers for a railway bridge located in France. During the construction process, fellow engineers on the project were steadily quitting, and Eiffel eventually took charge of the entire project. Nepveu saw the work that Eiffel performed on the site, and continued to place Eiffel in other jobs that involved project management of railway bridges and structures. During these projects, Eiffel got to know other engineers of the time. Without the influence of Nepveu and the opportunity to ride on his coattails, Eiffel might not have been as successful as he became.



Eiffel Tower at sunrise.

Career

Eiffel et Cie., Eiffel's consulting and construction firm, with the support of Belgian engineer Théophile Seyrig, participated in an international bid to design and build a 160-m long railway bridge over the Douro river, between Porto and Vila Nova de Gaia, Portugal. His proposal was the winner because it was a beautiful, transparent, economic structure. It incorporated the use of the method of forces, a then novel technique in structure design developed by Maxwell in 1864. The Ponte Maria Pia is a double-hinged arch that supports a single-line railway plate through pillars that reinforce the whole of the bridge. The construction proceeded rapidly and the bridge was built in less than two years (5 January 1876 to

FOCUS (CONT.)

4 November 1877). It was inaugurated by King D. Luís and Queen D. Maria Pia, after whom it was named. The bridge was in use until 1991 (114 years), when it was replaced by the S. John Bridge, designed by engineer Edgar Cardoso.

Gustave Eiffel also designed La Ruche in Paris. This, like the Eiffel Tower, became a city landmark. It is a three-story circular structure that looks like a large beehive and was created as a temporary structure for use as a wine rotunda at the Great Exposition of 1900. He also constructed the Garabit viaduct, a railroad bridge near Ruynes en Margeride in the Cantal département. The only structure in the Americas designed by Eiffel is the lighthouse located on Mona Island, Puerto Rico. The lighthouse was built around 1900 by the United States, which acquired the island after the end of the Spanish-American War. It was decommissioned in 1976.

In 1887, Eiffel became involved with the French effort to construct a Panama Canal. The French Panama Canal

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TECHNICAL ARTICLE (CONT.)

Consider a W14x43 column section in a braced frame. This may be a column in a single story braced frame or a column at the top story of a braced frame. This section supports both gravity and seismic loads. The h/t_w ratio for this section is 37.4. Per Table B5.1, the limiting slenderness ratio (λ_r) for based on the web of this element is $1.49(E/F_y)^{0.5}$ or 35.9. Hence, this column is slender and subject to the provisions of Appendix B5.3. Among other criteria, Appendix B5.3 requires that design strengths be reduced and that section properties be calculated based on 'effective' section dimensions. Though tedious, these calculations may validate the use of this column for its intended application in the braced frame while the 2002 AISC Seismic Provisions may validate its use for its seismic application (seismically compact for h/t_w less than $3.14(E/F_y)^{0.5}$). A noteworthy consideration may also be this; commercially available and commonly used structural design software does not perform this slenderness check...it must be verified by hand.

In response to the previously raised question, an appropriate answer might be; there are certain conditions where the standard AISC criteria for compactness may be more stringent than the AISC Seismic Provisions.

Fortunately, the shapes falling within this criterion are among the minority. If one chose to eliminate these shapes from his design database the net result is not likely to amount to a dramatic change in cost or performance. As an alternative to the column example mentioned previously, the next size up (W14x48) does not suffer from the same 'slenderness' classification and will certainly result in lower demand/capacity ratios for the given scenario. Such measures could be judged on a case by case basis.

The new 13th Edition of the AISC Steel Construction Manual, though different in an organizational sense, has essentially the same criteria for web slenderness and resulting effects (Q factors).

MESSAGE FROM THE BOARD (CONTINUED FROM PAGE 1)

- 2- To educate the public about the practice of structural engineering.
- 3- To provide a forum for members to exchange ideas, experience, and knowledge.
- 4- To encourage its members to maintain strict ethical standards in their professional practice.
- 5- To develop standards and guidelines, and to disseminate information among structural engineers for the benefit of the profession and the public.
- 6- To aid and support the laws regarding the practice of structural engineering in the State of Utah.

To accomplish these goals, SEAU not only has a board of directors with seven members but also seventeen committees; one of which was created this year. If you want to know what the committees are and who the chairpersons are, jump on the SEAU web site. You may find a committee on which you would want to be involved. Typically the committees meet during lunch, with lunch being picked up by SEAU.

It has been a great experience to be on the board of directors. I have seen first hand how SEAU works to accomplish the goals listed in the by-laws. Actually, it isn't SEAU that is accomplishing these goals; it is individuals who are members of SEAU who are working to accomplish these goals. Are you one of these individuals?

It has caught my attention how some firms are really involved in SEAU and other firms hardly at all. In our

firm, we encourage all of our engineers to be involved in at least the monthly meetings. Through Microsoft Outlook, they are invited to attend. When they accept the invitation, it is put on their Outlook calendar with a 26 hour reminder. That way they are automatically reminded the day before that there is a SEAU meeting.

I have now been involved in SEAU for over 20 years. In this time I have noticed that the Thursday monthly meetings are not attended as well as they used to be; even with more SEAU members. It has been an item of discussion many times at the SEAU board meetings. There are great refreshments provided for the half hour mingle before the meeting. A good portion of these refreshments are consumed by students, however, and not SEAU members. In fact, if not for engineering students attending the monthly SEAU meetings, the meetings in general would be poorly attended. The SEAU board has decided to have a drawing at the end of every SEAU monthly meeting. It will probably be a gift certificate to a restaurant. You need to be present to win.

In conclusion, let me misquote JFK, "Ask not what SEAU can do for you. Ask what you can do for SEAU". You will find that if you get involved in this great professional organization, the professional knowledge you will gain, the friends you will make, etcetera, will be worth the time you invest.

BULLETIN BOARD

SEAU – CODES COMMITTEE by MARK HARRIS



SEAU – UTAH SEISMIC SAFETY COMMISSION DELEGATE by JAKE WATSON



The Utah Seismic Safety Commission (USSC) is a state sponsored commission working to reduce seismic risk in Utah. Barry Welliver has served as SEAU's delegate for the last several years. Recently, he served as commission

chair and continues to volunteer on the Engineering and Architecture committee. SEAU and Utah owe a great debt to Barry and his past work.

USSC is moving forward with several main focuses. With help from our residential and seismic committees, USSC is working to publish a document outlining seismic hazards in Utah. The document will be based on California's "Putting Down Roots in Earthquake County" document and we hope to publish it through the major papers in Utah. It will contain information on earthquake myths, steps for after an earthquake, likely consequences of an earthquake in Utah, and ways to

prepare for an earthquake. This document will be made freely available to the public.

USSC is also planning a joint meeting with our counterparts in Nevada. We have tentatively scheduled a meeting for the spring in St. George. We hope to learn from each other what tools and methods have been effective for earthquake preparedness.

Recently the Utah State Office of Education requested USSC's support for an educational building inventory initiative. The office hopes to solicit legislative funding and initiate a rapid visual screening program throughout the state. The information will allow school districts and the state to prioritize seismic mitigation funding needs. More importantly, it will shed light on the state of our current education infrastructure so long-term funding needs can be addressed.

These are just three of many USSC goals. Barry Welliver and several USSC members are working to finish a new strategic plan for USSC with these and other goals in mind. If there are any items you would like to see USSC address, please let me know.

UPCOMING EVENTS

Fall, 2006

SALT LAKE COMMUNITY COLLEGE COURSE (CEEN 2900-002). SLCC has a new steel design course outreach for the practicing engineers, detailers and fabricators is taught two nights per week, 5:30PM - 7:45 PM at the Lifetime Activity Center (LAC 109) class room and is worth 3 credit hours, .

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.

SEAU MEMBERSHIP APPLICANT PHOTO OF INTEREST

The following individuals have submitted applications for approval by the SEAU membership committee:

- | | |
|-----------------|--------------|
| Dallin Pedersen | Student |
| Daniel T. Fares | Professional |
| Saiid D. Jirsa | Professional |

SEAU NEWS SUBMITTAL DEADLINE

November SEAU News deadline is **October 26th**.

We expect updates from the following committees:

- SEAU Board Member (Senior)
- Seismic Committee
- Structural Licensing Committee
- Legislative Committee

SEAU NEWS SUBMITTAL DEADLINE

EERI is seeking nominations for the Shah Family Innovation Prize. Please see seau.org for further info.

Lateral Earth Pressure Does Exist.



As seen in the above photo, the contractor placed a trench too close to a lateral earth retaining wall which resulted in a collapse of the wall.

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SEAU Presents:

New Non-Destructive Techniques for Structural Evaluations

November 16, 2006

5:30 PM

Engineering and Mines Building (EMCB) Room 103
University of Utah Campus
Salt Lake City, Utah

Dr. Paul Tikalsky,

Chair of the University of Utah Civil & Environmental Engineering Department
will be the speaker.

New Techniques are being developed to assist engineers in identifying damage and ensuring structural integrity of building systems. These techniques add to the tools that engineers can use to assess damage after earthquakes or other defined events, but also provide a means of verifying constructed components and identifying as-built defects. Dr. Tikalsky will discuss the advancing technologies as well as techniques that should be retired from the toolbox of assessment
See the website seau.org for further information.

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