



SEAU NEWS

The Newsletter of the Structural Engineers Association of Utah

Volume VI- Issue VII April 2002

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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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Weber State Student Housing, Ogden, Utah, by Reeve & Associates

IN THIS ISSUE

Message From The Board p 1

Member Forum..... p 2

Bulletin Board p 4

Special Insert – Preliminary Outline of the Standard Practice Guidelines for Structural Plans & Calculations

APRIL EVENT

SPECIAL MEETING:
National Seismic Data-Share Network System

▼
Thursday April 18, 2002

4:00 – 5:30 p.m.

Presented by:

NSF & USGS

Location:

University of Utah
EMCB Room 120

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General Membership Meeting to follow at 6:00 to 7:30 p.m.

Topic:

Standard Practice Guidelines

Location:

EMCB Room 103

MESSAGE FROM THE BOARD

LEGISLATIVE COMMITTEE AND PROFESSIONAL PRACTICES AND ETHICS COMMITTEE REPORTS



By David Brown,
SEAU Member of the Board,
UEC Delegate

Legislative Committee

The Legislative Committee monitored the 2002 Session of the

Utah State Legislature. The intent was to identify and track new bills that would be of interest to SEAU members. The following bill is the only one that I could identify that was worth reviewing. This bill was passed by the Legislature:

Amendments to the Utah Uniform Building Standards Act (S.B. 55) was passed. The amendments clarify and modify the circumstances in which political subdivisions are required to follow codes adopted by the Division of Occupational Health and Professional Licensing, in collaboration with the Uniform Building code Commission. The act gives the division authority, in collaboration with the commission, to approve certain other codes, without adopting them.

For the most part the amendments removed references to specific building codes (i.e. UBC, NEC, NFP, etc.) from the *Utah Uniform Building Standards Act* text, and revised wording to allow

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 and related firms. This month the focus is on:

SME Steel Contractors

You may be wondering why SEAU News is featuring a steel fabricator this month. We thought more or less the same thing at first, but then after a little while saw it made sense due to the fact that without us, structural engineers' work would have little chance of progressing beyond drawings on paper.



Caesar's Coliseum, Las Vegas, Nevada

SME Steel is a structural steel fabricator and erector that has shops in both West Jordan, Utah, and Pocatello, Idaho. Our West Jordan shop is 100,000 square feet and our Pocatello facility is 200,000 square feet. SME has been in business for 10 years and prior to that existed as Stott Incorporated. We have the capacity to produce 800 tons of structural steel per week – or in other words, we can ship a 4 story building every week.



The Gateway, Salt Lake City, Utah

Although SME is not a design firm, it does have two professional engineers on staff who are involved in many areas of design. Our Chief Engineer was involved in the SAC project that resulted in the FEMA 350 reports on Special Moment Frame Connections. He is also a member of AISC's Research Committee, Technical Advisory Committee, Committee on Technical Assistance and is a traveling lecturer for AISC's LRF D Connection Design Series. SME is also in the process of testing our own Buckling Resistant Brace.



Pacific Bell Ballpark, San Francisco, California

As those of you who have worked with us in the past may know, SME's engineers like to participate in "Value Engineering". We work with the Engineer of Record on many of our projects to rework connections to make the fabrication and erection of your buildings easier and cheaper. We value the working relationships we have developed with engineering firms all over the West and believe that SME brings extra value to your steel projects. We also encourage anyone with questions on connection design to contact us for help.



Pacific Shores, Redwood City, California

A few of the projects that we have been privileged to produce are; Aladdin Hotel and Casino in Las Vegas, Cesars Coliseum in Las Vegas, Salt Place Convention Center Phase I and II in Salt Lake, and Pacific Bell Ballpark in San Francisco. SME is currently in the process of fabricating and erecting the Uof U Medical Center Expansion.

MESSAGE FROM THE BOARD (continued from page 1)

the Building Code Commission to specify codes.

Professional Practices and Ethics Committee

This committee, chaired by Jonathan Richards, was very active this past year. In addition to following up on a DOPL investigation, the committee prepared a draft of a document that the SEAU board sees as an important link between building officials and structural engineers. The Standard Practice Guidelines is a recommended procedure, with checklists, for building officials and plan reviewers to assess the adequacy of structural engineering permit packages. It is also an excellent guide for practicing engineers who are preparing permit packages. The intent is to establish a minimum acceptable standard for structural engineering quality that is in the best interest of public safety and is uniform and consistent throughout the state.

The draft text of the guidelines was published in the SEAU March, 2002 newsletter. The SEAU Board would like all members to review this draft and offer comments or suggestions to the committee. Our plan is to finalize the draft and work with DOPL and reviewing entities to

get the guidelines in use. We believe that DOPL and the building officials will welcome guidelines such as these.

Continuing Education

Some of you who are registered in more than one state are aware of continuing education requirements for professional engineers. I am personally registered in four states representing a sampling from across the country. Three of the four states now require continuing education. Two states implemented this requirement this year.

The three states all have similar requirements, which leads me to believe that all states who will be requiring continuing education will probably be using a similar model. Some states, such as Florida, require that all professional engineers attend a full day of a Florida disciplinary board meeting, or attend a specific class on rules and ethics then pass an examination, to meet part of the requirements. Florida emphasizes rules and ethics as much as technology as qualifications for professional engineers registered in their state. Most require attendance at seminars or classes as chosen by the engineer.

I suggest that you revisit our February newsletter and reread the

article by Dr. Reaveley on the need to stay current. I believe that Utah is headed the same direction as most of the other states and continuing education will be a requirement here in the near future. The statute is in place and it awaits action by DOPL to incorporate this into the rules. This will happen when DOPL is ready to take on the additional regulatory obligations. We all need to be thinking and preparing for this. This will be a continuing agenda item for the SEAU Board and you will be reading more about this in future articles.

Commentary

The SEAU Board is committed to promote and maintain a Professional Image that is consistent with performance of our organization, our members, and our profession. To do so means that we must first perform at a high level, then get the word out to our clients and the public. The second part is purely P.R., but based on performance. If we are successful our work will be considered as more than a line item on the expense side of our client's books, rather it will be looked at as value added that is more than the cost.



BULLETIN BOARD**BULLETIN BOARD EDUCATOR FEATURE**

Each month for the next three months SEAU News is featuring the structural engineering activities of the Civil Engineering Department from one of Utah's three largest universities, highlighting their areas of research and expertise and research projects they are pursuing. This month's focus is on:

UNIVERSITY OF UTAH

The Department of Civil and Environmental Engineering at the University of Utah employs 17 full time faculty members in addition to numerous associate faculty and research assistants. Students may pursue emphases in a number of civil engineering branches within the department including environmental, geotechnical, transportation, water resources, and structural.

In recent years the department has gained notoriety in the intermountain region and also on a national scale as a premier research facility for structural analysis and full scale testing. The department's success can be attributed in large part to a state-of-the-art load frame that has enabled researchers to perform full scale testing of a variety of structural elements and systems. Testing to date has included; the full scale loading of a variety of steel moment frame connections and moment frame joint configurations; carbon fiber reinforcement and fiber reinforced polymers as potential systems of concrete strengthening and restoration; the in-plane strength of wood shear walls; the out-of-plane strength and ductility of hollow masonry walls injected with epoxy foam resin; and the connection of pre-cast concrete panels, among others.

In terms of educating future structural engineers, the department provides numerous advanced design and analysis courses and research opportunities for its students. In addition to courses that teach students the appropriate design and use of basic structural materials, advanced courses provide learning opportunities that give students additional tools to help them better prepare for the structural engineering profession. Among other advanced topics, the department provides

opportunities for students to learn the more advanced principles of earthquake engineering and structural dynamics, wind analysis, design for snow and avalanche loads, stability, reliability, advanced strengths of materials, finite element method, bridge design, and computer aided design.

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Peggy Ogzewalla, Executive Director

UPCOMING EVENT

SEAU will present an all-day seminar on the wind load provisions of the 2000 IBC for its May meeting.

Date:
May 15, 2002

Time:
8:00 a.m. – 5:00 p.m.

Place:
University of Utah
Engineering and Mines Classroom Bldg.
Room 103

Cost:
To be determined

Please mark your calendars and plan on attending.

BULLETIN BOARD

ACI 318 CODE CHANGES

The 2002 version of ACI 318 has incorporated some significant changes to some of the criteria and design methods for reinforced concrete. Perhaps the most significant change is the adoption of the ASCE VII-98 load combinations and revisions to the strength reduction (ϕ) factors.

Those of you familiar with ASCE VII (and LRFD steel design) will recognize the basic equation of the factored load effect of $U=1.2D+1.6L$ which in ACI 318-02 (and most other codes) is the leading combination that will control for most scenarios involving gravity loads only. You might ask yourself, "Doesn't this result in a factored load effect for gravity less than the old equation of $U=1.4D+1.7L$?" The answer is, yes. However, in addition to the adoption of the ASCE VII load combinations, the ϕ factors (strength reduction factors) have also changed. Though the ϕ factor for flexural design has remained at 0.9 for most cases, others cases have changed such that the final design will not likely be different from that required by the earlier ACI 318 provisions. The load factors have been reduced, which results in a less conservative design. In addition, the ϕ factors have been reduced, which results in a more conservative design. Therefore, the net result will not likely differ much between ACI 318-99 and ACI 318-02.

The ϕ factors for concrete design according to ACI 318-02 are dependent totally on the level of net tensile strain (ϵ_t) on a concrete member. Members with a net tensile strain in the outermost layer of reinforcement of 0.002 and less are classified as "Compression Controlled", while those with a net tensile strain of 0.005 and greater are classified as "Tension Controlled". Sections with net tensile strains between 0.002 and 0.005 are termed "Transitional". Tension controlled sections have a ϕ factor 0.90 whereas compression controlled members have a ϕ factor of 0.70 for members with spiral confining reinforcement and 0.65 for all other members. For values of net tensile strain between

0.002 and 0.005 the values of ϕ are to be linearly interpolated (see Figure 1). Other ϕ factors that have changed in the 2002 version of ACI 318 include; shear and torsion where $\phi = 0.75$ and bearing on concrete where $\phi = 0.65$.

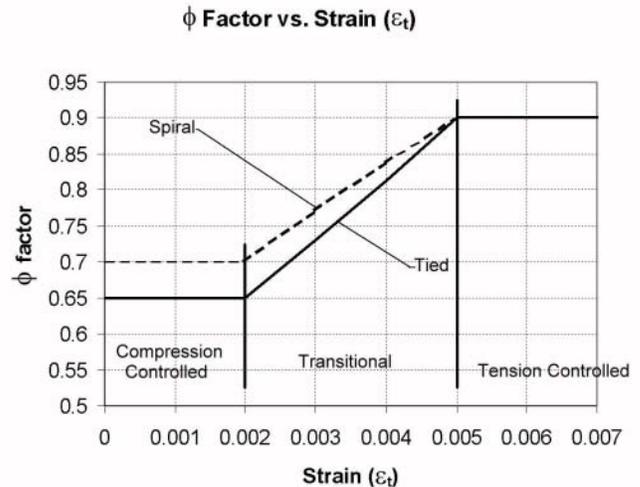


Figure 1

Earlier versions of ACI 318 set maximum limits on the reinforcing ratio (ρ) for flexural members with the purpose of ensuring ductility in design. As a maximum, earlier codes set a reinforcing steel ratio equal to 0.75 times the balanced steel reinforcing ratio (ρ_b). This assured a likely ductile failure mechanism of steel yielding. For ACI 318-02 ductility in design of flexural members is prescribed by ensuring that the minimum level of net tensile strain (ϵ_t) in the outermost layer of reinforcement is at least 0.004, approximately double the yield strain of the reinforcement. A flexural member is defined as a member with an axial load of less than $0.10f'cA_g$. Calculating the level of net tensile strain associated with the 0.75 times the balanced steel reinforcing ratio (ρ_b) will yield a result of 0.00376. Thus, ACI 318-02 requirement of $\epsilon_{t(\min)}=0.004$ for flexural members is slightly more conservative than that of previous versions of ACI 318.

SPECIAL MEETING PRESENTATION:

**NATIONAL SEISMIC DATA-SHARE
NETWORK SYSTEM**

Presented by:

National Science Foundation & United States Geological Survey

April 18, 2002

4:00 – 5:30 p.m. (pizza will be served)

University of Utah

Engineering and Mines Classroom Bldg

Room 120

SEAU General Membership Meeting will be held afterward from 6:00 to 7:30 p.m.
in EMCB Room 103.

Topic of Discussion: Standard Practice Guidelines – Study the outline printed in last month's newsletter or the copy included in this issue. All SEAU members are strongly urged to attend and bring your copy along with comments and suggestions as this guideline will eventually become the standard for practice for Utah engineers. If you do not take responsibility to participate in this undertaking, then forever hold your peace. Specific items of discussion will include stamping of drawings.

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