



SEAU *NEWS*

The Newsletter of the Structural Engineers Association of Utah

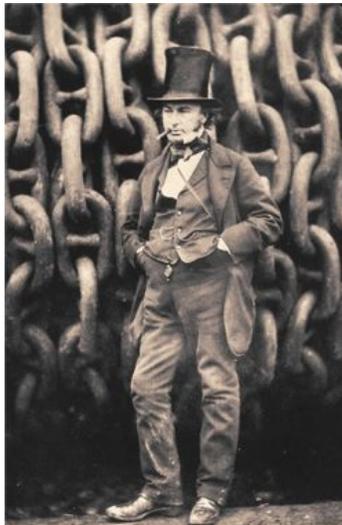
Volume XI- Issue II October 2006

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.

*Articles may be submitted to:
Richard Seelos, Editor
(801) 486-3883 rseelos@reaveley.com
Advertisements may be submitted to:
Jerod Johnson, Advertising
(801) 486-3883
jjohnson@reaveley.com*

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Isambard Kingdom Brunel

before the launching of the *Great Eastern* Photo Courtesy of the Institution of Civil Engineers see page 2.

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OCTOBER EVENT

AISC SEMINAR

Seismic Design –Updates and Resources for the 21st Century

October 5, 2006
7:30 AM-5:00 PM
Orson Spencer Hall, U of U

See page 10

MESSAGE FROM THE BOARD

THE ROOKIE



By Barry Welliver,
SEAU President Elect

In lots of ways I consider myself a relative newcomer to SEAU and thought I might use this opportunity to briefly reflect on my professional

development both here and in California.

I graduated from the University of Connecticut in 1973 and moved to California to pursue an interest in earthquake engineering. This was a very interesting time due to the active participation of the Structural Engineers Association of California in developing seismic design and I became involved in SEAONC first in the Young members forum and later in other committee activities. I worked for several Bay area firms and eventually established my own private practice in 1980.

Several personal circumstances converged which allowed our family to move to Utah in 1995 and I opened an office while maintaining my practice in California. I quickly

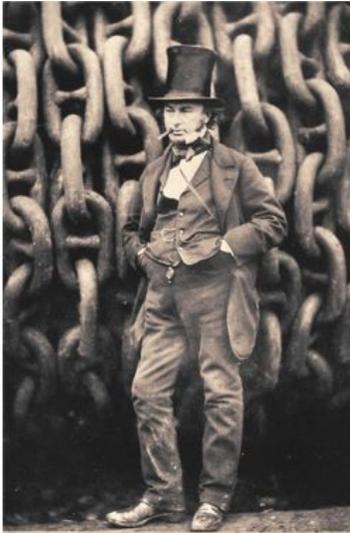
CONTINUED ON PAGE 4

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:



Isambard Kingdom Brunel

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 Isambard Brunel. He was a well known tunnel, bridge, and railway engineer in the mid 1800's. The following is an excerpt from the online encyclopedia Wikipedia. For the full article please see Wikipedia. <http://en.wikipedia.org>. All photographs in the article are attributed to the author and are used with permission or under public license.

Isambard Kingdom Brunel, (9 April 1806 – 15 September 1859), was an English engineer. He is best known for the creation of the Great Western Railway, a series of famous steamships, and numerous important bridges.

Though Brunel's projects were not always successful, they often contained innovative solutions to long-standing engineering problems. During his short career, Brunel achieved many engineering 'firsts', including assisting in the building of the first tunnel under a navigable river and development of the first propeller-driven ocean-going iron ship, which was at the time also the largest ship ever built.

Brunel suffered several years of ill health, with kidney problems, before succumbing to a stroke at the age of 53. Brunel was said to smoke up to 40 cigars a day, and get by on only four hours of sleep a night.

Early life

The son of engineer Sir Marc Isambard Brunel and Sophia, née Kingdom, Brunel was born in Portsmouth, Hampshire, on 9 April 1806. His father was working there on block-making machinery for the Portsmouth Block Mills.

At 14 he was sent to France to be educated at the Lycée Henri-Quatre in Paris and the University of Caen in Normandy. Brunel rose to prominence when, aged 20, he was appointed chief assistant engineer of his father's greatest achievement, the Thames Tunnel, which runs beneath the river between Rotherhithe and Wapping.

The first major sub-river tunnel, it succeeded where other attempts had failed, thanks to Marc Brunel's ingenious tunnelling shield — the human-powered forerunner of today's mighty tunnelling machines — which protected workers from cave-in by placing them within a protective casing. Marc Brunel had been inspired to create the shield after observing the habits and anatomy of the shipworm, *Teredo navalis*.

Most modern tunnels are cut in this way, notably the Channel Tunnel between England and France.

Brunel established his design offices at 17–18 Duke Street, London, and he lived with his family in the rooms above.

R.P. Brereton, who became his chief assistant in 1845, was in charge of the office in Brunel's absence, and also took direct responsibility for major projects such as the Royal Albert Bridge as Brunel's health declined.

Thames Tunnel

Brunel worked for nearly two years to create a tunnel under London's River Thames, with tunnellers driving a horizontal shaft from one side of the river to the other under the most difficult and dangerous conditions.

Brunel's father, Marc, was the chief engineer, and the project was funded by the Thames Tunnel Company. The composition of the Thames river bed at Rotherhithe was often little more than waterlogged sediment and loose gravel, and although the extreme conditions proved the ingenuity of Brunel's tunnelling machine, the work was hard and hazardous.

FOCUS (CONT.)

The tunnel was often in imminent danger of collapse due to the instability of the river bed, yet the management decided to allow spectators to be lowered down to observe the diggings at a shilling a time.

For the workers the building of the tunnel was particularly unpleasant because the Thames at that time was still little better than an open sewer, so the tunnel was usually awash with foul-smelling, contaminated water.



Image courtesy of Andrew Rendle
The Thames Tunnel in 2005, now part of the London Underground East London Line between Rotherhithe and Wapping.

Bridges

Brunel's solo engineering feats started with bridges — the Royal Albert Bridge spanning the River Tamar at Saltash near Plymouth, and an unusual timber-framed bridge near Bridgwater.



Image courtesy of Owen Dunn
The Royal Albert Bridge, seen from Saltash railway station.

Built in 1838, the Maidenhead Railway Bridge over the Thames in Berkshire remains the flattest, widest brick arch bridge in the world and is still carrying main line trains to the west. There are two arches, with each span totalling 128 ft (39 m), having a rise of only 24 ft (7 m), and a width that carries four tracks.

The Royal Albert Bridge was designed in 1855 for the Cornwall Railway Company, after Parliament rejected his original plan for a train ferry across the Hamoaze — the estuary of the tidal Tamar, Tavy and Lynher. The bridge consists of two main spans of 455 ft (139 m), 100 ft (30 m) above mean high spring tide, plus 17 much shorter approach spans. Opened by Prince Albert on 2 May 1859, it was completed in the year of Brunel's death.



Image courtesy of Adrian Pingstone
The Clifton Suspension Bridge spans the Avon Gorge, linking Clifton in Bristol to Leigh Woods in North Somerset.

However, Brunel is perhaps best remembered for the Clifton Suspension Bridge in Bristol. Spanning over 700 ft (213 m), and nominally 200 ft (61 m) above the River Avon, it had the longest span of any bridge in the world at the time of conception. Brunel submitted four designs to a committee headed by Thomas Telford and gained approval to commence with the project. Afterwards, Brunel wrote to his brother-in-law, the politician Benjamin Hawes: 'Of all the wonderful feats I have performed, since I have been in this part of the world, I think yesterday I performed the most wonderful. I produced unanimity among 15 men who were all quarrelling about that most ticklish subject — taste.' He did not live to see it built, although his colleagues and admirers at the Institution of Civil Engineers felt the bridge would be a fitting memorial, and started to raise new funds and to amend the design. Work started in 1862 and was complete in 1864, five years after Brunel's death.

The Great Western Railway

In 1833, before the Thames Tunnel was complete, Brunel was appointed chief engineer of the Great Western Railway, one of the wonders of Victorian Britain, running from London to Bristol and later Exeter. Brunel made two controversial decisions: to use a broad gauge of 7 ft (actually 7 ft 0.25 in or 2140 mm) for the track, which he believed would offer superior running at

FOCUS (CONT.)

high speeds; and to take a route that passed north of the Marlborough Downs, an area with no significant towns, though it did offer potential connections to Oxford and Gloucester and then to follow the Thames Valley into London.

Drawing on his experience with the Thames Tunnel, the Great Western contained a series of impressive achievements — soaring viaducts, specially designed stations, and vast tunnels including the famous Box Tunnel, which was the longest railway tunnel in the world at that time.

Brunel's achievements ignited the imagination of the technically minded Britons of the age, and he soon became one of the most famous men in the country on the back of this interest.

After Brunel's death the decision was taken that standard gauge should be used for all railways in the country. Despite the Great Western's claim of proof that its broad gauge was the better (disputed by at least one Brunel historian), the decision was made to go with Stephenson's standard gauge, mainly because this had already covered a far greater amount of the country.

By May 1892 (when the broad gauge was abolished) the Great Western had already been re-laid as dual gauge (both broad and standard) and so the transition was a relatively painless one.

The great achievement that was the Great Western Railway has been immortalized in the Swindon Steam Railway Museum.

MESSAGE FROM THE BOARD (CONTINUED FROM PAGE 1)

discovered SEAU after talking with Ken Willmore, applied for membership, and began my involvement as minuteman (secretary) of the seismic committee. Over the course of the last eleven years I've had the opportunity to meet many, though not all, of you and hope in this coming year to become familiar with your stories as well.

Last month, Jeff Miller set the tone for the upcoming year for SEAU and I hope you share in this vision for your organization. The opportunities to participate in committee work are plentiful and a goal of engaging all members will help assure that the vision reflects the widest range of opinion.

The NCSEA conference last month here in Salt Lake was an exciting opportunity to meet engineers from across the country. SEAU was prominent in several discussions about licensing the practice of structural engineering and we will pursue this concept in the coming year. This will involve asking some tough questions about who we think we are; who "they" think we are; and how we can achieve a measure of respect as design professionals. We should make every effort to approach this important step by developing a position which reflects a consensus understanding of what it should mean to practice structural engineering in the state of Utah.

Another effort being put forth by NCSEA is to help member organizations be advocates for their profession. The Students and Educators subcommittee has for the last three years developed posters showing the part structural engineering plays in our world. These posters are intended to be distributed to high schools to help students considering career choices understand the structural flavor of engineering. We received 100 copies and I offer them as vehicles for you to visit your

local schools and become a promoter for your profession.

The Structural Engineers Emergency Response committee has been active in our state explaining what they offer to cities, towns and local governments. This groundwork will help point those in responsible charge toward a volunteer resource they might otherwise have not been aware of. SEAU has established this community service because we have the knowledge and experience to help in post disaster evaluations of buildings and we choose to help others. This effort will be further organized regionally and eventually we will seek agreements with other surrounding states to help supplement the available number of inspectors.

There is a new committee now focusing on existing buildings in SEAU. This topic eventually makes its way into every engineering office as we all work on projects involving buildings or structures constructed prior to the present building code. While this is a rather broad definition there are certainly ages and classes of buildings we might agree deserve some special measure of attention. As structural engineers we are keenly aware of the advances in seismic design and should use our knowledge to help fashion recommendations which reduce this danger. Unreinforced masonry grew as a resourceful solution for building when pioneers were unaware of the seismic danger. Today we need to put this risk in perspective and work toward educating an unsuspecting public before it becomes all too evident following a damaging earthquake.

These are some of the passions I have for being an engineer. I appreciate your vote of confidence and look forward to serving SEAU with the enthusiasm of a rookie and hopefully the experience of an old(er) hand.

UPCOMING EVENTS**October 5, 2006**

AISC SEMINAR: Seismic Design –Updates and Resources for the 21st Century. See page 8 for additional information

October 19, 2006

SJI SEMINAR: Specifying and Designing with Steel Joists and Joist Girders. See SEAU website for additional 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.

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, .

Taught by Samuel W. Chung, Ph.D., PE, Research Professor, University of Utah the course focus is on connection and eccentricity in beam design, bracing, lateral loads, value engineering, and overall design of a steel building of 7 - 10 stories all according to LRFD. See SEAU website for additional information

BULLETIN BOARD**SEAU – SEISMIC COMMITTEE by STEVE COHN**

The State Board of Education has created a Ten Year Mitigation Plan for Seismic Safety in Schools. The first part of this plan is to request funding from the State of Utah in the next legislative session to perform “Rapid

Visual Screening” of all the school buildings state wide that have not previously been studied for seismic safety.

In the Mitigation Plan it is estimated that the cost of providing this study would be about \$500,000 plus travel costs. As a line item in the budget for the next year’s school funding the State Board of Education has included this cost. If approved schools may apply for the funding to complete the studies.

The Mitigation Plan then recommends that a each school district and charter school “create a seismic safety committee to look at the results of the building-specific seismic reviews and develop a district/charter policy statement and criteria for prioritizing each building into an overall plan and time-line to deal with mitigating the seismic hazards.” This seismic safety committee would possibly be “made up of the seismic review consultant structural engineer, building architect, the School District Building Official, facility director/staff, someone representing the public, people representing teachers and building level administrators, and others as needed.”

The next step would be to “encourage local school district and charter school boards to create a facilities financial implementation plan committee tasked with establishing the dollar costs and outlining the final implementation of the plan.”

The Mitigation Plan also includes a suggested funding for implementing the seismic safety plans developed. The concept of funding is stated as follows, “It is recommended that the State Board of Education ask the Legislature for \$25 million each year for ten years, with each \$25 million from year two through ten increased by an index reflecting the increased cost of construction, School districts and charter schools must match the legislative seismic grant funds, dollar for dollar, so that the \$25 million becomes \$50 million each year, and the ten year mitigation becomes \$500 million plus, after inflationary increases.”

Currently the State Board of Education is only submitting to the legislature in their overall budget the request to complete the RSV. It is felt that if the legislature sees the total estimated cost of retrofitting the schools before the RSV is complete that the total could discourage some from approving to have the initial seismic assessments complete. Along with this, it is hoped that the State of Utah will be more willing to fund seismic retrofit once the extent of the problem can be quantified.

On the legislature, the Code Chairs for Public Education Appropriations Subcommittee over the State Board of Educations budget is Senator Howard Stephens and Representative Gordan Snow. We would encourage you to contact these legislatures and encourage them to approve this bill. The Seismic Committee has considered writing a form letter that SEAU members could us but have not had a chance to do such as of yet. If you’d like a complete copy of the Mitigation Plan or would like to lend a hand to the Seismic Committee on this and other issues please contact us.

SEAU – NCSEA REPRESENTATIVE by BARRY ARNOLD

SEAU had the opportunity to host the NCSEA 2006 Annual Conference in Salt Lake City in September. The weather wasn't as good as I had hoped for, but everyone's spirits were kept high by the invigorating

presentations and the opportunity to mix with our peers from around the country and discuss issues that are relevant to structural engineers.

person gets to take credit for that; all of the previous SEAU Presidents, Boards, Committee Chairpersons and committee members and the general membership are to be congratulated for the efforts they exerted to make SEAU the amazing organization it is today.

NCSEA encouraged each SEA to form an advocacy committee to help strengthen the profession by informing the public about our services through articles in local and national magazines, presentations at conferences and seminars, and effective and up-to-date web sites.

NCSEA encouraged us to increase the number of members in SEAU by having an active membership drive and marketing our association. More members of SEAU means more members of NCSEA, which increases the volume of our voices and relevance in the local and national arena. The strength of any organization lies in the strength of its members. More members means the depth and breadth in our understanding the issues structural engineers face.

Many of the leaders of NCSEA told me what a wonderful conference it was including the Friday technical sessions and dinner venue. The Saturday session included NCSEA's Committee reports and was a great time to talk to and compare notes with the other SEA's from around the country. I heard many compliments about what a progressive and active organization SEAU is. I was, and you should be too, proud to belong to SEAU. It was an honor to stand up and tell NCSEA and the other delegates that our membership has topped 300 and describe the activities and service of a few of SEAU's committees. SEAU is a shining example of what an SEA should be. No one

NCSEA endorses and promotes the idea and recommends each SEA work toward separate licensure for structural engineers. They're also promoting uniform SE practice acts for every state.

One truth that became very evident as I spoke with other SEA members is that regardless of where you practice in the country, structural engineers all face the same problems. Eroding fees, substandard work, ethics violations, lawsuits, etc. were common complaints. It also became quite clear that unless structural engineers, in a unified voice, take control and direct their profession its course will be dictated by someone else (e.g. lawyers, judges, architects, contractors or other engineering associations).

NCSEA's primary goal and purpose is to support member organizations like SEAU. Be a part of SEAU and NCSEA by volunteering and being an active participant in a committee.

SEAU – PROFESSIONAL PRACTICE & ETHICS/STANDARD OF CARE COMMITTEE by RON DUNN

The Ethics Committee has been "standing down" for the past few months. We have been directed by the Board of Directors to suspend our "reviews" until some liability issues are better understood. It is my understanding this is but

a short vacation. Our charge as a committee is to be the representative resource from SEAU in the review of potentially substandard work, work completed outside the expertise or experience level of one's advertised ability, or any other conduct deemed professionally unethical. The intention of this effort is not to punish but to educate; not to expose but to protect.

Communication is still the weak link. With respect to professional conduct (where an engineer's license is in jeopardy) our committee acts in behalf of and takes direction from only DOPL and/or their appointed representatives. Our deliverable is simply a professional opinion presented to DOPL for their use in conducting further review. Our committee has no power to take any further action. With respect to this type of issues our committee should not hear from individual members of SEAU. It is our understanding that not following this protocol can be deemed unethical and may expose the accuser to a more serious accusation.

With respect to other issues (SEAU membership) which do not result in disciplinary action we stand ready to respond. A direct call or letter can be received by a member of our Board. Assistance can be provided with respect to protocol, assisting in the interpretation of our

SEAU – PROFESSIONAL PRACTICE & ETHICS/STANDARD OF CARE COMMITTEE (CONT.)

(SEAU) previously published documents and other related professional practices. As a unified body of engineers we should be as one, however; we are in fact competitors. We must be careful this distinction is understood and that we behave accordingly. We have had a few members yell “fire” inappropriately and without warrant. At the end of the day such action is usually stemmed from jealousy in lieu of being substantiated by facts. Any supposed ethical issue no matter how small is not to be discussed freely in any

board meeting, inappropriately by a board member, or in other committee meetings.

As an organization SEAU has made great strides in assisting the members, elevating the engineering bar and promoting unity. Working together, sharing information and helping each other to succeed will make us strong. I hope our job as a committee is always easy! Do what you do best, and take time to do it!!

SEAU – NCSEA 2006 CONFERENCE COMMITTEE by BARRY ARNOLD

With regards to the success of the NCSEA 2006 Annual Conference I’d like to thank and congratulate Julie Ott, Chandra Clyde, Jerel Newman, Craig Cartwright, Dan Bradshaw and Kim Robinson. They were all part of SEAU’s NCSEA 2006 Conference Committee and spent a lot of time planning and organizing the event. The conference was a huge success for NCSEA and this fine committee of dedicated committed individuals is responsible. They did an outstanding job! It was an honor and privilege to work closely with each of them. I’m proud to have been of service to them as the committee chairperson.

Many glowing accolades were heaped on SEAU and our Conference Committee from many conference attendees and NCSEA’s Leadership. They were in awe at the committee’s resourcefulness, tenacity, insight, imagination and vision.

Except for a few housekeeping items the SEAU NCSEA 2006 Conference Committee was officially disbanded on September 15, 2006 at midnight. I will miss the camaraderie of those dedicated committee members I served with and I will always be grateful for the time we spent laboring together.

Sincerely,
Barry Arnold S.E. SECB

Below is a list of the individuals and companies that sponsored the conference. When you see them or work with these companies please tell them thank you for supporting the structural engineering profession.

American Institute of Steel Construction	Gold
ARW Engineers	Gold
Barry H. Welliver	Bronze
BHB Consulting Engineers PC	Silver
Big D Construction	Gold
Calder Richards Consulting Engineers	Bronze
Canyons Structural Consulting	Gold
Chandra Clyde	Copper
CMT Engineering Laboratories	Gold
Dunn Associates, Inc.	Platinum
Edwards & Daniels Architects	Copper
GEM Buildings	Silver
Julie Ott	Copper
Reaveley Engineers	Gold
Restruction Corporation	Copper
Simpson Strong-Tie Co.	Gold
Steel Encounters, Inc	Gold
Structural Engineers Association of Utah	Platinum
Utelite	Silver
Vulcraft	Gold

SEAU MEMBERSHIP APPLICANT

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

Joshua S. Black	Associate
Glen Bancroft	Associate
Scott Roche	Professional

SEAU NEWS SUBMITTAL DEADLINE

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

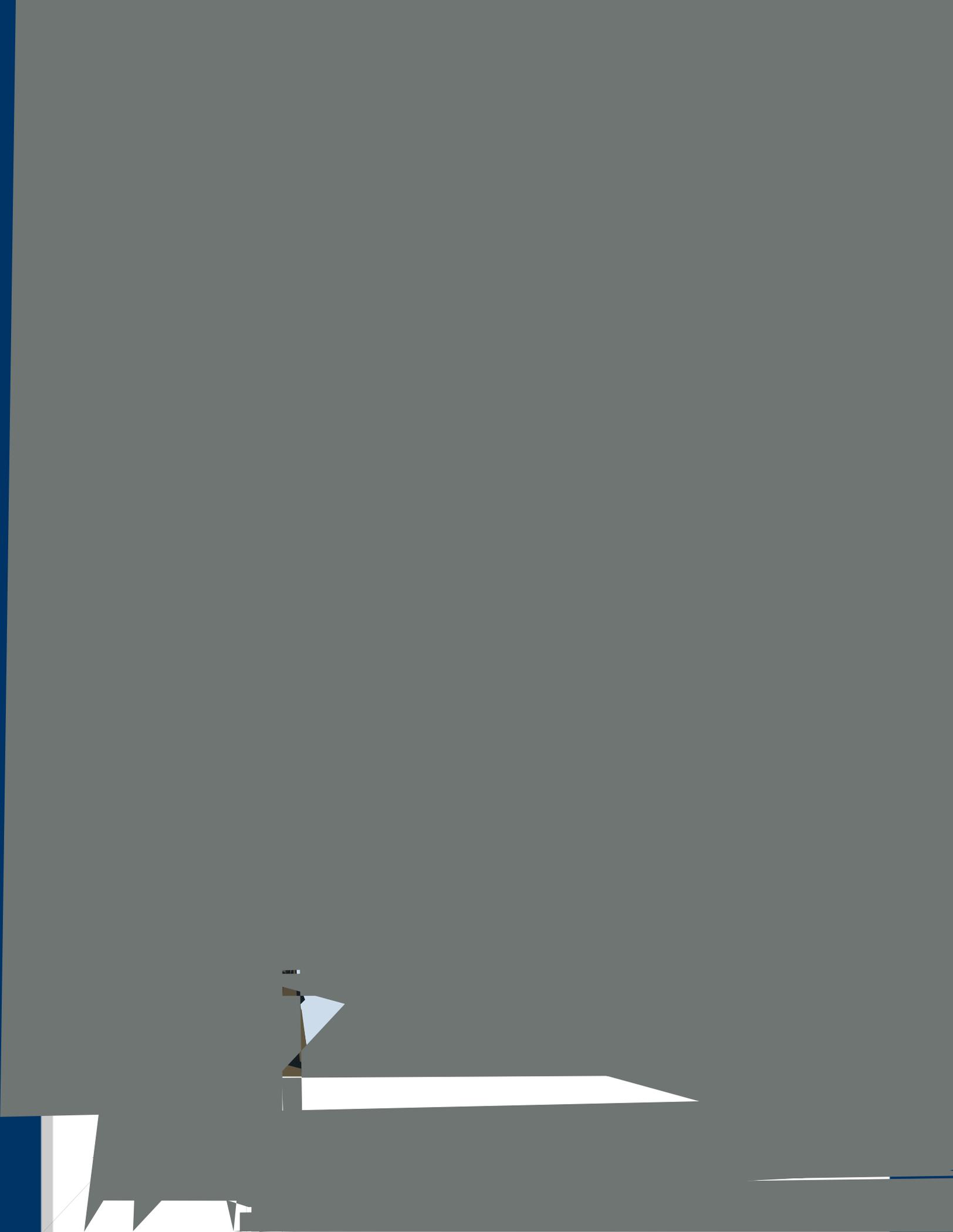
We expect updates from the following committees:

- Codes Committee
- Structural Licensing Committee
- USSC Representative
- Emergency Response Committee

SEAU NEWS ERRATA

In the September issue of SEAU News the NCSEA Representative was listed incorrectly. The correct information is as follows:

NCSEA Representative	Barry Arnold: (801) 782-6008
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SEAU Presents:

AISC Seismic Design

Updates and Resources for the 21st Century

October 5, 2006

7:30 AM to 5:00 PM

Orson Spencer Hall Building (OSH)
Waldermer P. Reed (WPR) Auditorium
University of Utah Campus
Salt Lake City, Utah

Thomas A. Sabol, PH.D., S.E, Principal, Englekirk & Sabol Consulting Engineers, Inc. will be the speaker.

The purposes of the seminar is to:

- introduce the 2005 AISC Seismic Design Manual.
- address quality assurance and special welding requirements for steel seismic systems.
- introduce the 2005 AISC Moment Frame Prequalified Connection Standard
- introduce the 2005 AISC Seismic Provisions

Includes a copy of the **2005 AISC Seismic Design Manual** (which contains the 2005 ASIC Seismic Provisions and the 2005 AISC Moment Frame Prequalified Connection Standard) and a copy of the course notes and design examples.

Cost \$150 with partial funding provided by Utah Division of Occupational & Professional Licensing.
See the website seau.org for further information.

STRUCTURAL ENGINEERS ASSOCIATION OF UTAH

P.O. Box 581292

Salt Lake City, Utah 84158-1292

www.seau.org



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