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Los Angeles Section

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PRESIDENT'S MESSAGE

Yazdan Emrani, P.E. Los Angeles Section President



Global Climate Change: Fact or Fiction? and What are Civil Engineers Expected to Do About It?

Several years ago, when I was the President of the ASCE Orange County Branch, I wrote an article about Global Warming. I was somewhat surprised about the number of responses I received from our readership to that article, both positive and negative. In fact it had the highest number of respondents to any of the articles I have written prior to, or since. It has been exactly seven years since I wrote that article and I thought why not update the article and gauge the reaction of a broader audience.

It is not that I don't have enough excitement in my life, but this is an important issue in my opinion. Furthermore, I would like to know how we as Civil Engineers plan to deal with this issue. Now it is difficult to try and cover all of the intricacies of this issue in one article. But, I'll do my best.

First, let's talk about the background of Global Climate Change. Since the late nineteenth century, atmospheric scientists in the United States and overseas have known that significant changes in the chemical composition of atmospheric gases might cause climate change on a global scale. In 1824, the French scientist Jean-Baptiste Fourier described how the earth's atmosphere functioned like the glass of a greenhouse, trapping heat and maintaining the stable climate that sustained life. By the 1890s, some scientists, including the Swedish chemist Svante Arrhenius and the American geologist Thomas Chamberlain, had discerned that carbon dioxide had played a central role historically in regulating global temperatures. In 1896, Arrhenius provided the first quantitative analysis of how changes in atmospheric carbon dioxide could alter surface temperatures and ultimately lead to climatic change on a scale comparable with the ice ages. In 1899, Chamberlain similarly linked glacial periods to changes in atmospheric carbon dioxide and stated that water vapor might provide crucial positive feedback to changes in carbon dioxide. In the first decade of the twentieth century, Arrhenius further noted that industrial combustion of coal and other fossil fuels could introduce enough carbon dioxide into the atmosphere to change the temperature of the planet over the course of a few centuries. However, he predicted that warming would be delayed because the oceans would absorb most of the carbon dioxide.

Now there are some basic Global Climate Change definitions and facts that all sides seem to agree on: Gases created through human industrial and agricultural practices (primarily carbon dioxide from burning fossil fuels and wood, as well as methane, nitrous oxide, and chlorofluorocarbons) increase the heat- reflecting potential of the atmosphere, thereby raising the planet's average temperature. In other words, the sun's radiation comes in the form of light waves and heats up the earth. Some of the radiation that is absorbed and warms the earth is re-radiated back into space in the form infrared radiation. Some of the outgoing infrared radiation is trapped inside the atmosphere. That is a good thing because it keeps the temperature of the earth within certain boundaries, keeps it relatively constant and livable. But the problem is that this thin layer of atmosphere is being thickened by all of the global warming pollution that is being put up there. More of the outgoing infrared is trapped. So the atmosphere heats up worldwide, hence the term "Global Warming".

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LA County Recognition



PRESIDENT'S MESSAGE

However, this issue is not that simple. On a hot July or August day when the temperatures are well above normal here in California, and have triggered rolling blackouts, you may not get many arguments against "Global Warming". But what about the recent severe cold snap coined the "Polar Vortex" throughout the South and Eastern states. What happened to Global Warming then?

Despite the overwhelming evidence that our planet is warming, there are two points of perpetual confusion that combine with our psychology to make winter weather a seasonal boon for climate skepticism. For one, a cold snap where we live should not be confused for a global event.

While the recent polar vortex had communities across the eastern and southern U.S. scrambling to deal with frigid weather last couple of months, it may have seemed to Americans like the whole world was locked in an icy grip. It was easy to forget that while the East Coast and portions of the South were bundling up against the frigid cold, unusually warm winter temperatures were making the news in parts of Europe, including Sochi, Russia, where temperatures were hovering around 60 degrees Fahrenheit in the middle of the Winter Olympics. So, no, Global Warming isn't suddenly a myth because it was really cold and snowing out in Atlanta. We should not confuse short-term weather with longer-term climate.

In fact, though it seems counterintuitive, global warming may be bringing about extreme cold, according to scientists like Dr. Jennifer Francis, a research professor at Rutgers University's Institute of Marine and Coastal Sciences. The cause is believed to lie in the jet stream, the fast-flowing river of air high above the Earth that marks the boundary between cold, polar air to the North and warm tropical air to the South. As the jet stream shifts position back and forth over North America throughout the year, it plays a major role in the weather patterns and temperatures we experience in the U.S. In recent years, the movement of the jet stream has changed significantly, bringing "weather whiplash" with strange, out-of-season weather events more frequently than in the recent past.

Additionally, what is often unnoticed is the fact that Global Climate Change causes more precipitation but more of it coming in one time big storm events, because the evaporation off the ocean puts all the moisture up there when storm conditions trigger the downpour before it falls down. The insurance industry has actually noticed this. The insurance industry says they are being hit first and hardest by global climate change. As climate change continues to disrupt the environment, natural disasters are on the rise. The United Nations Environment Program reports that natural disasters are doubling every decade and over the last 15 years, the damage adds up to more than \$1 trillion.

Global Climate Change paradoxically causes not only more flooding, but also more droughts. One of the reasons for this has to do with the fact that Global Climate Change not only increases precipitation worldwide, but it also relocates the precipitation. Global Climate Change also creates more evaporation of the ocean that seeds the clouds, but it also takes out moisture out of the soil. Soil evaporation increases dramatically with higher temperatures and that has consequences for us in the United States as well. We have also seen empirical evidence to that end. Over the last few years there have been drastic changes in weather patterns across the world and here in the US. Hurricane season used to start on June 1 and end on November 30th; now it is starting earlier and ending later. Here in the west, we are experiencing one of our worst draughts. Fire season used to be much more defined than it is today, instead of stretching throughout the whole year with brief respites. Flooding in Asia, including in India, as well as China has worsened over the last few years.

In 2012, The American Society of Civil Engineers (ASCE), the Canadian Society for Civil Engineering (CSCE) and the Institution of Civil Engineers in United Kingdom (ICE) issued a joint statement about emerging global challenges over the last decade. The statement emphasized the financial crisis, population migration, and food and energy crises, which have reinforced the need to secure and fulfill internationally agreed commitments to sustainable development. The three organizations also believe that sustainable progress toward achieving the United Nations Millennium Development Goals is necessary to address water and food scarcity.

The Statement further states that for the aforementioned commitments to be realized, adaptation of infrastructure to climate change is critical. To address climate change, the engineering profession needs to apply the principles of sustainability, energy efficiency and innovation to the design, construction, operation and maintenance of infrastructure. Engineers must develop infrastructure capable of adaptation to the effects of climate change.

Engineers have relied upon historical data to design infrastructure. Such data is often incomplete and limited in duration. Now they must develop design and operational practices to withstand climate conditions, both extremes and gradual changes. They must accommodate increased uncertainties because the data about future climate will never be as precise as the historical data. This creates a challenge to existing infrastructure design approaches and practices. Critical infrastructure must be adapted to the impacts of climate change and resilient to natural and man-made disasters.

Civil engineers have an obligation to protect cultural and natural diversity, and they are central to the planning, design, construction, operation, maintenance and decommissioning of infrastructure networks that underpin civil society and economic activity and protect human health and welfare. Emerging challenges have reinforced the key role of these networks in enabling global societal resilience.

ASCE, CSCE and ICE support the internationally agreed upon development goals contained in the Millennium Declaration as they apply to improving the quality of people's lives around the world through science and engineering. The three organizations will work with each other and with domestic and international organizations to engage engineers in addressing the needs of the poor through capacity building and the development of sustainable and appropriate solutions to poverty. By helping meet the goals of the Millennium Declaration, the engineering profession contributes to a world where all people have access to the knowledge and resources to meet their basic human needs and promote sustainable development. Included are such areas as water supply and sanitation, food production and processing, housing and construction, energy, transportation and communication, income generation, and employment creation.

So, what do you think about the current and future weather related challenges? And more importantly what would you like to see or do in infrastructure adaptation in light of this emerging environment? I would like to hear from you on this subject and projects you have done or are doing in this area, so drop me a line and I will share the highlights with our readership.

State Investments and Legislative Update

by Richard Markuson, CA Region 9 Legislative Advocate



Five-Year Plan Released

The Department of Finance has released <u>Five-Year</u> Infrastructure Plan, that assumes "\$25.6 billion will be available from various funds including federal funds, Cap and Trade funds, Prop 1A bond funds, and other sources" to help accomplish the High Speed Rail Authority's goals over the next five years.

The plan includes a \$1.7 billion in new

transportation funding and \$815 million for "deferred maintenance" projects.

"With a decade of intractable deficits behind us, California is poised to take advantage of the recovering economy and the tens of thousands of jobs now being created each month," Brown said. "By finally addressing this backlog of deferred maintenance, the state will keep its assets functioning longer and reduce the need to build costlier new infrastructure."

Transportation: The budget increases transportation funding over current levels by \$1.7 billion, including \$300 million in "rail modernization" funds for the high-speed rail project. Most (\$250 million) will be from the state's cap-and-trade program, the funds remaining from 2006's Proposition 1B, and the proceeds of early loan repayments from the General Fund. The use of cap-and-trade is not without controversy; Legislative Analyst Mac Taylor said, "It's a little hard for us to justify how you can use huge sums of money to pay the large capital costs when (cutting emissions is) a relatively small reason of why you're doing it."

Water: The plan calls for spending more than \$600 million on water storage and water quality, but Brown said he would "reserve judgment" on whether a larger, \$6.5 billion water bond should be put on the ballot. Brown has formed a drought task force to determine how the state should address the serious drought now gripping much of California.

Local infrastructure: The budget includes a proposal to dramatically expand Infrastructure Financing Districts (IFDs), to allow cities to invest in local infrastructure projects. The budget would expand the types of projects IFDs can currently fund, while also lowering the vote requirement to create these local authorities and issue debt from two-thirds to 55 percent.

Deferred maintenance: The budget also creates a new one-time \$815 million package of funds intended for deferred maintenance projects.

Legislative Update

The Legislature reconvened on January 6, 2014 and the two houses must act on all two-year bills by the end of the month. February 21 is the "bill introduction deadlines.

Appointments

Governor Edmund G. Brown Jr. made the following appointments. These appointments may require Senate confirmation.

To <u>State Water Resources Control Board:</u> Dorene D'Adamo (reappointed), Turlock, Democrat, former senior policy advisor to Rep. Jim Costa.

To <u>Central Valley Flood Protection Board</u>: Jane Dolan (reappointed), Chico, Democrat, executive director at the Sacramento River Conservation Area Forum, and an independent probate referee; William Edgar (reappointed), Sacramento, Democrat, co-owner of Edgar and Associates LLP (tax services); Michael Villines (reappointed), Placerville, Republican, former Assemblymember now owner of consulting firm Villines Group LLC.

To <u>California Water Commission</u>: David Orth (reappointed), Clovis, Republican, general manager of the Kings River Conservation District.

To <u>California Building Standards Commission</u>: Larry Booth, Sacramento, Democrat, president at Frank M. Booth, Inc. (HVAC and mechanical engineering contractor); David Malcolm Carson, Los Angeles, Democrat, general counsel and policy director for environmental health at Community Health Councils; Elley Klausbruckner, San Diego, decline-to-state, owner and principal at Klausbruckner and Associates Inc. (fire and building code consultants).

To the <u>Orange County Transportation Authority Board of Directors:</u> Ryan Chamberlain (reappointed), Trabuco Canyon, decline-to-state, director of Caltrans District 12.

To the <u>Riverside County Transportation Commission</u>: Basem Muallem, Chino Hills, Republican, director of Caltrans District 8.

To the <u>California High-Speed Rail Authority Board of Directors:</u> Tom Richards (reappointed), Fresno, Republican, chief executive officer at the Penstar Group.

The Senate Rules Committee has made the following appointments:

As a biostatistician on the <u>Scientific Review Panel on Toxic Air</u> <u>Contaminants:</u> Stanton Glantz (reappointed), San Francisco, Democrat, professor of medicine at UC San Francisco. Term ends January 1, 2017. As public member on the <u>Sacramento-San Joaquin Delta Conservancy</u> <u>Governing Board:</u> Darla Guenzler (reappointed), West Sacramento, Democrat, executive director of the California Council of Land Trusts. Appointment effective February 3, 2014 and term ends February 3, 2018.

As a public member on the <u>Delta Stewardship Council:</u> Patrick Johnston (reappointed), Stockton, Democrat, CEO of the California Assn. of Health Plans, and a former Senator and Assemblymember. Appointment effective February 3, 2014 and term ends February 3, 2018.

To <u>Santa Ana Regional Water Quality Control Board:</u> James Famiglietti, Irvine, Democrat, director of the UC Center for Hydrologic Modeling and professor of earth system science at UC Irvine School of Physical Sciences.

To <u>California Transportation Commission:</u> James Madaffer, 53, San Diego, decline-to-state, president of Madaffer Enterprises (public affairs, etc.) and publisher at Mission Publishing Group LLC.

Recent Reports

California State Transportation Agency released <u>The California</u> <u>Department of Transportation: SSTI Assessment and</u> <u>Recommendations</u>, written by State Smart Transportation Initiative (SSTI) from the University of Wisconsin, finds "Caltrans led the nation during construction of the interstate system after World War II, but has not adapted to modern trends in transportation including local control, more efficient land use, and demands for more mobility choices."

California Natural Resources Agency, California Environmental Protection Agency, and CA Dept. of Food and Agriculture have released the final <u>California Water Action Plan</u>, says "Governor's proposed

2014-15 budget lays a solid fiscal foundation for implementing nearterm actions for the plan, recommending \$618.7 million in funding for water efficiency projects, wetland and watershed restoration, groundwater programs, conservation, flood control and integrated water management."

The Legislative Analyst's Office has released its report, <u>The 2014-15</u> <u>Budget: Overview of the Governor's Budget</u>, finds that Gov. Brown's proposal for a new rainy-day fund requirement "underscores the importance of regular state contributions to a larger budget reserve," and "overall, the Governor's budget plan would place the state on an even stronger fiscal footing."

Environmental Defense Fund has released <u>California Carbon Market</u> Watch: A Comprehensive Analysis of the Golden State's Cap-and-<u>Trade Program, Year One</u>, finds "The average price for allowances suggests that reducing emissions under the cap may be less costly than some expected."

The Legislative Analyst's Office has released Counties and Design-Build, a summary of reports received by the LAO from counties using the design-build construction management model in which "an agency contracts separately for the design and construction of a project," recommends the Legislature considers changes to the model such as "creating a uniform design-build statute for agencies that have design-build authority, eliminating cost limitations, and requiring project cost to be a larger factor in awarding design-build contracts." Caltrans released reports on development of non-motorized transportation facilities for FY 2012-13, findings include 39 projects totaling \$11.9 million approved from the Bicycle Transportation Account and on projects funded through Public Transportation Modernization, Improvement, and Service Enhancement Account that was created after Prop. 1B passed in 2006, states that "of the \$3.6 billion available for commuter or urban rail, bus, waterborne, or other transit projects in California, \$2.45 billion has been allocated."



Day: 1st Friday of February, April, June, August, October, and December **Time:** 7:30 am – 10:00 am **Location:** ASCE LA Section Office, 1405 Warner Ave., Ste B., Tustin, CA 92780

Everyone is welcome

34th USSD Annual Meeting and Conference

April 7-11, 2014



Host

San Francisco Public Utilities Commission

Conference Theme

Dams and Extreme Events — Reducing Risk of Aging Infrastructure under Extreme Loading Conditions

Four Concurrent Workshops — April 10

Hyatt Regency San Francisco Airport San Francisco, California

Program Summary

Sunday, April 6 4:00 p.m. - 7:00 p.m. Monday, April 7 7:00 a.m. - 6:00 p.m. 9:00 a.m. - 4:30 p.m. 4:30 p.m. - 6:00 p.m. 6:00 p.m. - 8:00 p.m. **Tuesday, April 8** 7:00 a.m. - 8:00 a.m. 7:00 a.m. - 5:30 p.m. 8:00 a.m. - 9:30 a.m. 9:30 a.m. - 10:00 a.m. 10:00 a.m. - 12:00 noon 12:00 noon - 1:15 p.m. 1:30 p.m. - 3:00 p.m. 3:00 p.m. - 3:30 p.m.

5:30 p.m. - 7:30 p.m.

3:30 p.m. - 5:30 p.m.

Wednesday, April 9

7:00 a.m. - 8:00 a.m. 7:00 a.m. - 5:30 p.m. 8:00 a.m. - 9:30 a.m. 9:30 a.m. - 10:00 a.m. 10:00 a.m. - 12:00 noon 12:00 noon - 1:15 p.m. 1:30 p.m. - 3:00 p.m. 3:00 p.m. - 3:30 p.m. 3:30 p.m. - 5:00 p.m. 7:00 p.m. - 10:00 p.m.

Thursday, April 10

7:30 a.m. - 8:00 a.m. 8:00 a.m. - 12:00 noon 12:00 noon - 12:45 p.m. 1:00 p.m. - 5:00 p.m. 1:00 p.m. - 5:00 p.m.

5:30 p.m. - 11:30 p.m.

Friday, April 11

7:30 a.m. - 6:00 p.m.

Registration

Registration Committee Meetings Annual Meeting of Members Kick-off Reception/Exhibition Opens

Continental Breakfast in Exhibit Hall Registration Opening Plenary Session Break in Exhibit Hall Opening Plenary Session, continued Lunch with Speaker Five Concurrent Sessions 1 Break in Exhibit Hall Five Concurrent Sessions 2 Reception, Exhibition & Poster Session

Continental Breakfast in Exhibit Hall Registration Five Concurrent Sessions 3 Break in Exhibit Hall Five Concurrent Sessions 4 Lunch with Speakers Five Concurrent Sessions 5 Break in Exhibit Hall; Exhibition closes Five Concurrent Sessions 6 Reception and Awards Dinner

Workshop Registration Workshops Lunch Workshops Field Tour — Lower Crystal Springs Dam Complimentary Shuttle Transportation to San Francisco

Field Tour — Calaveros Dam and Los Vaqueros Dam



CalOES Safety Assessment Program (SAP) Training

Friday, March 14, 2014 Ventura City Hall (directions) Community Meeting Room 501 Poli Street, Ventura Start time 8:30 AM

The actual training takes about 6 hours of class time but with breaks and lunch (provided) you will spend most of the day in beautiful downtown Ventura. Our Evaluator/Trainer will be Andrew Stuffler, the City of Ventura's Chief Building Official.

Be prepared to have your photo taken after the training session for use on your Evaluator Identification Card.

The class is limited to the first 80 people registered and paid by February 28, 2014.

Cost:

- ASCE Santa Barbara/Ventura Branch Members Free
- Government Employees Free
- All other ASCE Members (non-Government Employees) \$10*
- Non ASCE Members \$25*
- * for the 260+ page training manual

Sponsored by the Santa Barbara-Ventura Branch of ASCE and the City of Ventura

TO REGISTER CONTACT: Autumn Glaeser, P.E. alg@penfieldsmith.com (805) 963-9538 ext. 166

Mail Checks Payable to: ASCE SB-V c/o Autumn Glaeser 111 E Victoria Street Santa Barbara, CA 93101

"The Safety Assessment Program utilizes volunteers and mutual aid resources to provide professional engineers and architects and certified building inspectors to assist local governments in safety evaluation of their built environment in an aftermath of a disaster. The program is managed by Cal OES with cooperation from professional organizations. SAP produces two resources, SAP Evaluators, described above, and SAP Coordinators, which are local govern ment representatives that coordinate the program. CalOES issues registration ID cards to all SAP Evaluators that have successfully completed the program requirements. Training for this program is now eligible for Homeland Security Grant Program funding."

> - From the California Governor's Office of Emergency Services' (CalOES) Safety Assessment Program (SAP) webpage

ASCE Region 9 Excellent Civil Engineering in California

by Jay Higgins, P.E., F.ASCE, Region 9 Vice Chair and Governor for Los Angeles Section



As I brainstormed about what to write for this article with so many examples of excellent civil engineering projects throughout our four California Sections, I thought: Where do I begin? With our 15 designated National Historic Civil Engineering Landmarks? Perhaps our many State and Local Historic Civil Engineering Landmarks? How do I choose? I finally came to the conclusion that as the ASCE Region 9 Governor for the Los Angeles Section which just

completed their 100th anniversary year, I would talk about the final project of the Los Angeles Section Centennial Committee. This final effort, chaired by our Governor-at-Large, Mark Norton P.E. F.ASCE, is a book which will compile the many infrastructure articles written throughout Centennial Celebration year for the Section newsletter with many interesting facts and history of the L.A. Section. The newsletter articles captured the essence of the civil engineering achievement in the 10 county area of the Los Angeles Section. These include great projects designed and built by our civil engineers of yesteryear that benefited our society and helped make the Los Angeles region what it is today. Other sections have great projects too, but 100 years doesn't roll around that often and the other sections will also have the opportunity to showcase their significant projects during their Centennial Celebration in the coming years (San Diego in 2015 and Sacramento in 2021). San Francisco has already celebrated their Centennial back in 2005. Maybe with the publishing of a successful L.A. Section Centennial Commemorative book, it could serve as a model for other Sections. Wouldn't it be great if we have a 100th anniversary series of history books for all four Sections in the ASCE Region 9?

Mark has proposed the following outline for the ASCE L.A. Section Centennial Commemorative Book 1913-2013:

- Nicely designed Soft Cover
- Foreword from the Centennial Celebration Honorary Chair, Bob Bein, and Chair, Don Sepulveda
- Table of Contents
- · Centennial Committee and Book Contributors
- ASCE Los Angeles Section Timeline 1913 to 2013
- Centennial Year Overview ASCE News Society article and photo collages of Centennial year activities
- Newsletter articles published during the Centennial Year:
- o Past Leaders including a complete list of all past Section Presidents
- o Historic Landmarks
- o Transportation Infrastructure
- o Water Infrastructure
- o Runoff Management in Southern California

- o Development of Commercial Aviation Infrastructure
- o Long Beach & Los Angeles Harbors Infrastructure
- o Wastewater Treatment, Collection and Recycling
- o Urban Development and Sustainable Infrastructure

The book is envisioned to be in a 8 $\frac{1}{2}$ " x 11" format with a nicely designed color soft cover with about 120 pages with plenty of photos. It will also be available in digital format. It will be on sale through the book retailers and online through major book distributors (e.g. Amazon and Barnes and Noble). Keep an eye out for publication of the book about mid-year 2014.

By the way, if you would like to learn about the first 50 years of L.A Section history, the Section has produced a pamphlet for our 50th Anniversary, which is posted online at the L.A. Section's website. If interested go to http://46.105.251.113/Centennial/fiftieth/pamphlet.pdf#zoom=80 (or copy and paste the link in the address bar). The first article in the pamphlet was written by Trent Dames, a major worldwide figure in the field of geotechnical engineering. The pamphlet titled "A History of the Los Angeles Section" includes a description of major activities of the Section from 1913 through 1963.

I am very excited about the publication of the upcoming ASCE L.A. Section Centennial book. I'm sure it will of interest to all of the civil engineers in the Region and what a great way to wrap up our Centennial Celebration year. A big thank you to Mark Norton for taking on this task.

If you have any questions about this article, please contact Jay Higgins at jayhiggins896@gmail.com .



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MATERIALS SUBMISSION INFORMATION

All graphic materials submitted for use in the ASCE newsletter should have all fonts outlined, and links included; EPS or PDF files preferred. Other formats are Adobe InDesign or Adobe Illustrator (any version); additional acceptable file formats are JPEG or TIFF files (minimum 300 dpi). Images embedded in Microsoft Word documents should be sent separately, at a minimum resolution of 300 dpi at the display size desired. Collected files, including links and fonts, should be compressed and e-mailed, or sent on CD or Zip disk (provide return address). Business cards can be submitted electronically as well, or send clean, crisp, B&W laser print, unfolded. This publication's size is $8\frac{1}{2}$ " × 11".

A Great Idea from the Life Members

The ASCE Life Members' Public Image Committee request that members take their (to be discarded) Civil Engineering magazines to their doctor's office or barber shop and merge them with the stack of magazines. We feel that this will be an effective way to make the general public more aware of what civil engineers do.

Reminder:

Copy deadline for the April 2014 issue is March 1, 2014; copy deadline for the May 2014 issue is April 1, 2014

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L.A. Section web site at: www.ascelasection.org



of the Los Angeles Section



www.ascelasection.org



Creating value by delivering innovative and sustainable solutions for infrastructure and the environment.

2014 PE Review Course

January 4 - April 5, 2014 (13 Saturdays, no class on February 15) Centrally located in Irvine

RBF Consulting, a company of Michael Baker Corporation, presents our comprehensive Professional Engineering License Review Course to prepare applicants for the 2014 Civil Engineering License Exam. The course fee of \$1800 includes textbooks, practical exercises and 100 hours of instruction, including Seismic and Survey, taught by experienced engineering and surveying professionals. Participants can earn 10 CEUs by completing the course. Seismic and Survey can be registered for separately.

Visit our website www.rbf.com/Outreach/PE_Review.asp or contact Lori Schnaider at lschnaider@rbf.com or (949) 330-4138 for more information or to register for the course.

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NEWSLETTER INFORMATION

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