IN MEMORIAM

Bungale Taranath, Tall Buildings Expert, Passes Away

Dr. Bungale S. Taranath, S.E., P.E., Ph.D., a structural engineer known for his expertise on tall buildings, passed away peacefully on December 31, 2013 at his residence in Chino Hills, Calif. His engineering career spanned more than five decades and three continents, with stints at several firms, including Skidmore, Owings & Merrill, Walter P Moore, Ellisor & Tanner, John A. Martin & Associates and finally DeSimone Consulting Engineers, from which he retired. In addition to being a structural engineer on numerous projects throughout the U.S., his contributions as an engineering textbook author are enormous.

Born and raised in India, he received his early engineering education at the National Institute of Engineering Mysore. Following work in the construction industry in India and England, he attended the University of Southampton in the UK and obtained his doctorate degree in structural engineering. He then moved to the U.S. and worked for more than 40 years designing buildings and teaching young engineers the art of structural engineering. His five books on the design of tall buildings are a testament to his ability to simplify design and analysis, both of which have too often been made overly complicated and cumbersome in today's design offices.

He is survived by his wife of 44 years, Saroja; son, Abhiman and his wife, Kristin; daughter, Anupama and her husband, Rajesh; and four grandchildren.

PROJECTS

LeJeune Steel Named Fabricator for New Vikings Stadium

LeJeune Steel Co. (an AISC member/AISC Certified fabricator) has been named the steel fabricator for the new Minnesota Vikings stadium, which will use nearly 19,000 tons of structural steel.

LeJeune is searching for welders as it prepares to begin fabricating steel for the project, according to a recent article in the Minneapolis/St. Paul Business Journal. The company has started to draw plans for the project and will fabricate the steel through mid-2015.

To learn more about the new stadium, visit www.vikings.com/stadium.

People and Firms

- **Dean R. Wilson** has been named the 2014 president and chair of the board of the American Welding Society (AWS). Wilson has been active in the Society for more than 30 years and has served on numerous standing committees, including WEMCO, An Association of Welding Equipment Manufacturers, where he served as chair in 2005. During his presidency, Wilson will manage the affairs of AWS and preside at all board of directors and executive committee meeting, as well as represent the AWS at many of its local section meetings and other national and international meetings.

- **Walter P Moore** has promoted several principals at its various locations, including: **Gabriel Jiménez, S.E., P.E., P.Eng., Ph.D.**, senior principal and managing director of the Houston Diagnostics Group; **Sridhar Baldava, P.E.**, principal and senior engineer, research and development with the Austin Structural Engineering Group; **Stephen Blumenbaum, P.E.**, principal and senior engineer with the Tampa Structural Engineering Group; **Scott Martin, P.E.**, principal and senior project manager with the Tampa Structural Engineering Group; and **Justin Farr, P.E., S.E.**, and **Jeff Jansing, P.E.**, both principals and project managers with the Dallas Structural Engineering Group.

BRIDGES

TRB Recommends Uncoated Weathering Steel for Bridges

A "Report on Performance of Uncoated Weathering Steel (UWS) Highway Bridges Throughout the United States," recently published by the Transportation Research Board (TRB), concludes that UWS bridges perform well in most cases and, considering the economic and environmental benefits, continued or increased use of UWS is regarded as sound engineering practice.

A presentation on the paper at TRB's recent Annual Meeting reported that (1) the superstructure condition ratings of the majority of UWS bridges are classified as excellent or very good, based on the national criteria for these qualitative descriptors and (2) comparing these ratings of UWS bridges and other steel bridges within representative agencies, while accounting for differences in ages of the various populations, showed that UWS displays better or similar performance relative to other steel bridges.

The study was performed by the University of Delaware and funded by the Federal Highway Administration. The paper (number 14-1139) is available for download, along with all other papers presented at the 2014 Annual Meeting Compendium of Papers (visit **amonline.trb.org/compendium**).

ENGINEERING JOURNAL

Engineering Journal Q1 Now Available Online

The first quarter 2014 issue of *Engineering Journal* is now available online. You can view, print and share the current digital edition at **www.aisc.org/ej**. Papers in *EJ* Q1 include:

➤ **Experimental Investigation of Steel Joist Design for Ductile Strength Limit State**

Joseph Robert Yost, Timothy J. Harrington, Joseph J. Pote, Shawn P. Gross and David W. Dinehart

Open web steel joists are prefabricated truss assemblies designed in accordance with specifications set forth by the Steel Joist Institute (SJI). Currently, the SJI design requirement is based on capacity, with no consideration for the governing-member strength limit state. The purpose of this research is to investigate a ductile design methodology for steel joists where the primary strength limit state is characterized by tension-member yielding and large inelastic deformation, followed by a secondary strength limit state of compression member buckling. To achieve ductile behavior, a series of experimental joists were designed and manufactured using controlled overstrength ratios of relative member strengths so that tension-member yielding precluded compression-member buckling. The consequence of adjusting member strengths to induce ductile failure is a slight increase in joist weight. The experimental matrix consisted of 18 joist samples: six identical 33-ft-long K-series joists, six identical 33-ft-long LH-series joists and six identical 32-ft-long rod web joists. All joists were tested to collapse under simply supported uniform load conditions. Experimental results show that a ductile design is achievable because all 18 joists demonstrated tension-member yielding with significant deformation prior to a secondary limit state of compression member buckling.

Keywords: steel joists, strength design, yielding, ductile limit state

➤ **Experimental Verification of Spliced Buckling Restrained Braces**

Kenneth T. Tam, Ronald L. Mayes, David L. Mccormick, Anindya Dutta, and Craig B. Goings

A critical facility constructed in the 1980s was housed in a building whose original seismic force-resisting system included chevron-braced frames and pre-Northridge earthquake moment frames. In the mid-1990s, a code-based seismic retrofit was designed. This phased retrofit was only partially completed. A more recent seismic evaluation of the building in its partially retrofitted condition revealed major structural deficiencies. Another retrofit was designed using field-spliced buckling restrained braces (BRBs) that allowed the building to remain operational during construction. The paper summarizes the analyses performed for the seismic retrofit and the development, prototype testing and erection of the spliced BRBs. The project testing protocol was compared with current AISC *Seismic Provisions*' testing protocol for BRBs (AISC 341-10), which shows that if properly detailed and fabricated, BRBs used for this retrofit project can have peak and cumulative ductility well in excess of the current AISC testing criteria.

Keywords: seismic retrofit, buckling restrained braces, field-splice details

➤ **Local Stability of Double-Coped Beams**

Bo Dowswell and Robert Whyte

Localized web buckling can limit the strength of coped beams. In this paper, the coped portion of the beam is treated as an isolated rectangular member, and a parametric study is used to develop lateral-torsional buckling modification factors for use with 2010 AISC *Specification* Section F11. The parametric study included finite element models with different cope lengths at the top and bottom flanges and cope depths up to 40% of the beam depth. Compared with the finite element results in this paper, the proposed design procedure is more accurate than the design procedure in the 14th Edition *Steel Construction Manual*.

Keywords: web buckling, coped beams, double copes

PODCASTS

AISC Revives "Steel Profiles" Podcast Series

AISC's "Steel Profiles" podcast series returns after a one-year hiatus and provides audio access to valuable insights from leading steel design and construction professionals. The latest episode features a 30-minute interview with "Mr. Steel" himself, Robert (Bob) Disque, P.E., AISC alumni emeritus and former chief engineer. Play or download the podcast free of charge at **www.aisc.org/podcasts** (podcasts are also available for free on iTunes and RSS).

"I am very excited that the Steel Profiles podcast series is coming back from hiatus!" said Margaret Matthew, Steel Profiles host and AISC senior engineer. "I have many more fascinating people that I'm looking forward to interviewing. The podcast episodes are great listening and offer insight into the lives of these giants in our industry."

You can listen to these interviews with your favorite steel experts at your convenience and learn interesting and useful tidbits that you likely won't hear anywhere else. For example, in his interview, Disque shares personal experiences from his service in the U.S. Navy during World War II and what led him into civil engineering; his two-decade tenure as AISC's chief engineer and what prompted him to launch AISC's lecture series in steel design; his transition to teaching at the University of Maine before returning to AISC until his retirement; and his one piece of advice for structural engineers starting out in the field.

All of AISC's 23 Steel Profiles podcast episodes are available for online streaming and downloading at **www.aisc.org/podcasts**. The podcast recordings can be downloaded onto any media player and will automatically play on the user's default audio player, and they can be transferred onto any iPod or MP3 player. Those with an iTunes account (**www.itunes.com**) can download the podcast recordings (search "AISC Steel Profiles") and also have the option to subscribe to the series to have the podcast recordings automatically downloaded to their iTunes library free of charge.

Steel Profiles podcasts previously aired monthly and are returning on a limited basis throughout the year with new interview subjects. The next episode will feature an interview with Rafael Sabelli, S.E., principal and director of seismic design at Walter P Moore and a 2013 recipient of AISC's Special Achievement Award for his contributions to the literature on seismic design of steel and composite structures.

Additional information on all AISC Steel Profiles episodes can be found at **www.aisc.org/podcasts**.

CONSTRUCTION MARKET

2014 Forecast: More Projects and Spending

2014 will bring more to bid and 10% more total construction, says Ken Simonson, chief economist of the Associated General Contractors of America (AGC). Materials costs "should remain tame," but skilled labor availability is an increasing concern.

The Census Bureau reports that spending in November 2013 was the highest since March 2009. For the first 11 months of 2013 combined, year-to-date spending rose 5% from the same months in 2012, albeit unevenly distributed.

Private residential spending soared 18%, with a 45% leap in multi-family construction, a 28% jump in single-family homes and a 2% uptick in additions and major renovations to both types. Private nonresidential construction was unchanged. Public construction slipped 3%, with an 8% contraction in public educational spending.

Flat private nonresidential construction masked a climb in lodging construction of 26% as hoteliers modernized older properties, built new big-city hotels and located extended-stay properties in areas receiving an influx of oil and gas-related workers. Communications construction was down 13%, and power, down 11%.

For 2014, power, manufacturing, lodging and warehouse construction should post double-digit increases. Office and retail construction should make modest gains. Private hospital and educational construction will remain low, said Simonson.

Overall, private nonresidential construction should increase 5% to 10%. Private residential construction will grow 10% due to apartment construction; single-family homebuilding will probably stall later in the year. Public construction will slip, perhaps not as much as the 3% drop in 2013. In total, construction spending will rise close to 10%.

The Bureau of Labor Statistics (BLS) producer price indexes (PPIs) for new nonresidential building construction rose 3% to 4% between November 2012 and November 2013. This is moderate but larger than the PPIs for materials used in construction, which rose just 1% over the last 12 months.

Materials costs should remain tame in 2014. Diesel prices may fall slightly. Steel prices are climbing, after finishing 2013 roughly unchanged. Concrete and gypsum prices may rise modestly. All products should be in ample supply, and the materials price index is not likely to increase more than 3% from the December 2012 level.

Labor costs and skilled labor are bigger worries. Construction unemployment tumbled from 18.8% (not seasonally adjusted) in November 2010 to 8.6% in November 2013 as 890,000 left the ranks of the unemployed. With the industry adding only 327,000 employees in that span, it means experienced workers left the industry, at least for now.

Getting them back will require spending more on wages, benefits and bonuses. Overtime wages also will increase, and employer costs will probably go up 3% to 4% in 2014. Even then, more contractors will likely experience difficulty finding skilled craft workers, supervisors and estimators.

letters to the editor

Taking the Point Further

The article "Reinforcing the Point" (01/2014) is interesting and appropriate. I have some additional information concerning compression members, namely the effect of residual stresses on the strength of steel columns, and specifically how merely adding a weld bead to a loaded column could probably strengthen it sufficiently for the purpose in hand. Of course, the addition of plates would certainly be appropriate if the weld bead and the resulting residual stresses did not give sufficient additional strength. The effect of residual stresses on compression members was first published by me and my coauthor, Lynn Beedle, in "Basic Column Strength," ASCE Vol. 86, July 1960. There have been many papers on the topic of residual stresses in the following 30 years, and indeed residual stresses did play an important role in the determination of column curves as the basis for column design specifications.

Perhaps the one paper that is very appropriate to the January article, and discusses this topic further, is my article "The Reinforcement of Steel Columns" in the first quarter 1989 *Engineering Journal*.

—Lambert Tall, P.E., Ph.D.
Professor Emeritus
Founding Dean of Engineering
Florida International University
Miami

It was interesting to read the article "Reinforcing the Point" in the January issue. One thing in this article caught my attention: reinforcing W-beam with WT-section as shown in Fig. 1c on page 17. This would be our last option because of the following reasons:

- It is difficult to match both sections. Existing W-beam normally already has vertical deflection, and WT-section may bow in our out depending on rolling stresses. On the other hand, AWS D1.1:2010 allows a 3/16-in. maximum gap to bridge with fillet weld. Even if we can bridge the gap, we are typically looking for multiple-pass overhead welds.
- It is a challenge for the erector to position and hold WT-section in place until permanent welds are made; WT-section can't be easily clamped to W-beam bottom flange as, for example, horizontal plate.
- From a fabrication standpoint, it might be a waste of material if an uneven number of WT-sections is required for the reinforcement. When the fabricator makes WT-sections splitting W-sections, he is making two WTs out one W.

If for any reason we need to proceed with a similar reinforcement at W-beam bottom flange, we would prefer the following options over WT-section:

- HSS section (we can avoid overhead weld if HSS horizontal wall is wide enough).
- Channel oriented vertically or horizontally with toes down.
- W-section (with this option there is even a chance to select reinforcing W-section to avoid overhead weld: for example, reinforcing W16×31 (bf = 5.5 in.) with W8×24 (bf = 6.5 in.).

—Victor Schneur, P.E.
Chief Engineer
LeJeune Steel Company

New Year, New Look

The cover to the January issue is terrific (very chic)! And you are correct [in your January editorial] about how people refer to the magazine. In all the years I was privileged to work with you and *Modern Steel Construction*, I do recall referring to it, on occasion, as *Modern Steel*—but never as *MSC*.

—Brenda Aschliman
Formerly of Walter P Moore

I have put off writing for far too long to say how much I look forward to receiving my monthly copy of *MSC*, but this January's new format is particularly impressive, so I am compelled to chisel out some time to compliment you on what a classy production you edit.

Your upbeat, engaging "Editor's Note" casts the die each month for an uplifting introduction to what is invariably an outstanding collection of articles that I tear out and archive for reference. Indeed, I had to begin extracting the articles, rather than keeping the entire magazines, because of bulk. They had already taken over my office, our bathroom vanities and the commode tanks, and they were beginning to encroach on the dining room table when my wife finally put her foot down.

Which brings me to the weighty topic of how the world will end. I first heard this hypothesis applied years ago to *National Geographic*, so in applying it to *MSC*, it goes like this: Because none of us wants to throw away our back issues of *MSC*, the accumulating weight, concentrated principally in North America, will at some point cause the earth to become lopsided, shift on its axis and spin off into space, thereby spelling doom for civilization—alas, all attributable to your publication.

I had a chuckle at your January editorial this month leading off with, "It's not unusual for me to use diminutive forms when I talk with my children." Having taught the CAD detailing, welding inspection and nondestructive testing courses at Austin Community College since 1985, I have developed similar circumlocutions and euphemisms, though not strictly the diminutive forms you cite. If anyone can foul up a computer, it is a student, so experience has taught me all the standard workarounds to use on the fly to navigate past frozen screens and application errors.

But seriously, *MSC* provides must grist for my AWS Certified Welding Inspector (CWI) prep courses. I preach that while a thorough knowledge of AWS D1.1: Structural Welding Code—Steel will get them past the CWI exam, if they are not conversant with at least (1) the AISC *Manual*, (2) AISC 360: *Specification for Structural Steel Buildings* and (3) the RCSC *Specification for Structural Joint Using High-Strength Bolts*, they can expect to be ground to powder the minute they step through the doors of steel fab shops and encounter adversarial fabricators.

I wish the best to you and *MSC* in 2014!

—Warren Donworth, Ph.D.
Professor of Welding Inspection and Nondestructive Testing
Welding Technology Department
Austin Community College
Riverside Campus