Structural Stability Research Council

NEWSLETTER

Volume 2, Issue 2 **November 1, 2012**

2013 Beedle Award Winner: Professor René J.H. Maquoi

A native of Belgium, Professor Maquoi received his PhD from the University of Liège in 1973. After working as researcher at the Belgian Foundation for Scientific Research, he returned to the University of Liège and joined their faculty in 1979. With teaching responsibilities and research programs in structural analysis and the design of steel and composite structures, Professor Maquoi eventually became head of the Department of Mechanics of Materials and Structures at Liège. He has taken sabbatical leaves in Japan and Switzerland, lectured in many European countries, and taught courses in Vietnam as part of an official Belgian-Vietnamese agreement. During his academic career, he has served on the editorial board of several international journals.

Professor Maquoi has devoted most of his research activities to topics related to steel and composite construction, with emphasis on most areas of buckling, ultimate strength of structural elements and the effect of the beam-to-column joint behavior on the response of the structural system. He has been the principal investigator of several major research projects funded by the European Union. For most of his academic career, he has served on technical committees of many international organizations, including ECCS, IABSE, and SSRC. Under the supervision of the Centre Européen de Normalisation (CEN), he has been both directly and indirectly involved in the preparation of several parts of the European codes - henceforth designated Eurocodes. His primary contributions have been in the areas of steel and composite construction, as well as in calibrating some specification provisions of these codes.

In 2007 and with over 270 publications including books, book chapters, and papers in scientific journals and conference proceedings, Professor Maquoi retired from the University of Liège with the honorary title of "emeritus professor". Although his teaching and research responsibilities were officially completed, he has remained very active in training practicing engineers, located primarily in Belgium and Luxembourg, on the use of Eurocode 3 and Eurocode 4. He is also active in France, where he is the coordinator of a similar continuing education program organized by the École Nationale des Ponts et Chaussées. With a career devoted primarily to structural stability, codes, and design criteria, he continues to provide technical assistance to designers, steel fabricators, and control offices.

Professor Maquoi has received several national and international awards, including the degree of Doctor Honoris Causa from the Technical University of Lisbon, the Charles Massonnet Award from the European Convention for Construction Steelwork, the Gold Medal Gustave Trasenster, and the Medal of the Institute for Theoretical and Applied Mechanics from the Czech Academy of Sciences.

Professor Maquoi will give his Beedle Award Presentation: "*Are Designers Sufficiently Instructed to Make the Most Rewarding Use of the Latest Steel Codes?*" in the SSRC Track of the Conference, Session S9 on Friday at 10:00 a.m.

Inside this issue:

News/Announcements

2012 Vinnakota Award Winner

The Vinnakota Award is given to the MS or PhD student that prepares the best paper at the annual stability conference. The award was established in 1997 through a financial contribution made by Professor Vinnakota. The award was established to honor his parents, Sarada M. and Raju A. Vinnakota, who believed in education and research.

The 2012 Vinnakota Award winner was Mr. Mark Denavit from the University of Illinois at Urbana-Champaign. Mr. Denavit was supervised by Professor Jerry Hajjar and the title of the award winning paper is: "Stability Analysis and Design of Steel-Concrete Composite Columns." SSRC Chairman Professor Ron Ziemian is shown along with Professor Vinnakota at the left presenting Mr. Denavit with the award certificate.

This year the jury named two honorable mentions for the award. Andre Graça from the Technical University of Lisbon was recognized for his paper, "GBT-Based Assessment of the Buckling Behavior of Cold-Formed Steel Purlins Restrained by Sheeting" and Jonathan Eberle from Virginia Tech was recognized for his paper, "Computational Studies Aimed at Defining Bridging Requirements for Steel Joists."

Beedle Award Details

THE BEEDLE AWARD WAS ESTABLISHED TO HONOR THE LATE LYNN S. BEEDLE, A LEADER AND OUSTANDING CONTRIBUTER TO SSRC

The award has been established in honor of the late Lynn S. Beedle, an international authority on stability and the development of code criteria for steel and composite structures. He was a leader and outstanding contributor to the work of the Structural Stability Research Council for a period of more than 50 years, establishing the council as the preeminent organization worldwide in the area of structural stability. Through Lynn Beedle's dedicated work and leadership in the national and international arenas, the structural engineering profession has seen advanced concepts developed into practical engineering tools. He consistently and successfully endeavored to advance collaboration between researchers, engineers and code writers worldwide.

Recipients of the Lynn S. Beedle Award must meet the following criteria:

- Longtime member of SSRC.
- A worldwide leading stability researcher or designer of structures with significant stability issues.
- A leader in fostering cooperation between professionals worldwide.
- Significant contributions to national and international design code development.

The SSRC Executive Committee serves as the award committee. The award may be presented as frequently as annually. An individual can only receive the award once. The award is presented at the SSRC Annual Stability Conference. It consists of a framed certificate, signed by the SSRC Chair and Vice Chair.

Guide to Stability Design Criteria, Sixth Edition - Buy one today!

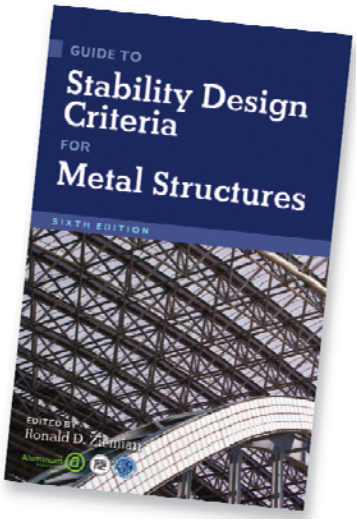
In the Spring of 2010, the sixth edition of SSRC's definitive publication *Guide to Stability Design Criteria for Metal Structures* became available. Often described as an invaluable reference for designing metal structures, the Guide is written by SSRC task group members who are leading experts in a wide range of structural stability topics. In fact, the book is heavily referenced in the commentaries to the latest editions of the AISC, AISI, AASHTO, and Aluminum design specifications.

In addition to providing updated chapters on beams, beam-columns, bracing, and plates, the Guide provides significantly revised chapters on columns, plates, box girders, curved girders, composite columns as well as structural systems, frame stability, and arches. Of particular note are two chapters, one on thin-walled (cold-formed) metal structural members and the other on stability under seismic loading, which include unprecedented coverage and easily justify the purchase of this 1100 page book.

From topics of the direct analysis method to the direct strength member design, the Guide provides comprehensive coverage of many state-of-the-art topics. Complete with over 350 illustrations, plus references and technical memoranda, the *Guide to Stability Design Criteria for Metal Structures, Sixth Edition* offers detailed guidance and background on design specifications, codes, and standards worldwide.

Be sure to purchase your copy today! The best way to purchase the Guide is via the SSRC website at http://stabilitycouncil.org

PURCHASE THE GUIDE AT HTTP://STABILITYCOUNCIL.ORG



SSRC Continuing Education Summary

At the 2013 SSRC conference in St. Louis, the short course Beam Buckling and Bracing will be presented by Professors Joe Yura and Todd Helwig. This four-hour short course concentrates on beam stability and bracing issues. Background and explanation of the lateral buckling and beam bracing provisions in the AISC Specification are presented. Some of the topics discussed are coped beams, correctness of treating the inflection point as a brace point, suspended span construction, system buckling, and brace stiffness and strength requirements. Numerous example problems illustrate the application of the bracing provisions for buildings and bridges. The cost of the short course will be $200 for members and $300 for non-members.

A four-hour short course titled "Cold-Formed Steel Design for Secondary Building Framing Members" was presented by SSRC at the 2012 NASCC. The course was offered from 8am-12pm on Wednesday, April 18. The short course was presented by Roger LaBoube and Mike Seek.

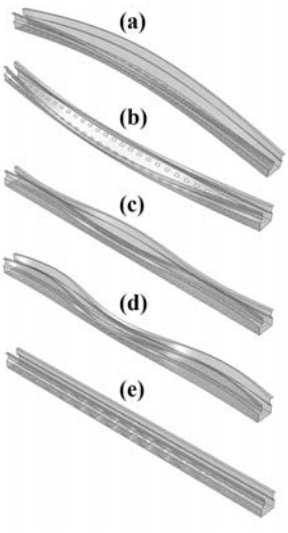
For many years cold-formed steel products have been used by the pre-engineered building manufacturers for roof and wall framing. Although engineers are versed in the use and design of hot-rolled steel members, they often lack an understanding of the behavior and design requirements for cold-formed steel members. Mixed structural framing systems, consisting of hot-rolled main frame members and cold-formed purlins and/or girts, can translate into a highly competitive framing solution. However, to properly combine hot-rolled and cold-formed members requires a clear understanding of the design requirements for the different components of the system. Using an example problem Roger LaBoube provided an overview of the behavior and the design of cold-formed steel members. Mike Seek presented an in-depth discussion of bracing requirements for cold-formed steel purlin roof systems. Available resources that may be useful for the design of cold-formed steel members were also discussed.

A SHORT COURSE ("BEAM BUCKLING AND BRACING") WILL BE PRESENTED AT THE 2013 NASCC BY PROFESSSORS JOE YURA AND TODD HELWIG

Ongoing Stability Research

Elastic Buckling Prediction of Thin-Walled Cold-Formed Steel Columns with Periodic Perforations

Frank Smith & Cristopher Moen
Virginia Polytechnic Institute and State University

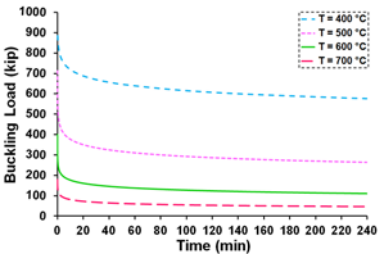


(a) Elastic Global Flexural Buckling, (b) Elastic Global Torsional-Flexural Buckling, (c) Elastic Symmetric Distortional Buckling, (d) Elastic Anti-Symmetric Distortional Buckling, (e) Elastic Local Buckling

Efforts are underway to extend the American Iron and Steel Institute's Direct Strength Method (DSM) to cold-formed steel storage racks with periodic perforations with a focus on simplified elastic buckling prediction methods for local, distortional, and global buckling. Over 1200 finite element eigen-bucking analyses have been conducted to identify critical elastic buckling modes for typical open rack sections containing industry standard periodic perforations. Variables considered in the FE modeling include hole size and pitch in the longitudinal and transverse directions and member thickness. Local and distortional elastic buckling prediction approaches have been developed and validated where reduced web thickness simulates the loss of plate bending and axial stiffness based on hole size and pitch. For elastic global flexural and torsional-flexural buckling, the classic cubic buckling equation, which is already implemented in steel codes around the world, is modified to include the influence of periodic perforations by employing weighted averages of the moment of inertia and St. Venant torsional constant, as well as a lowered net section warping torsion constant that simulates the interruption of longitudinal warping stresses developed by warping restraint.

Creep Buckling Behavior of Steel Columns Subjected to Fire

Mohammed Morovat, Mike Engelhardt, Todd Helwig, & Eric Taleff
The University of Texas at Austin; Sponsored by National Science Foundation



Representative creep buckling curves at high temperatures based on creep material model by Harmathy (W12×120, 20 ft. long)

The essence of performance-based structural fire safety design of steel building structures is the ability to predict thermal and structural response to fire. An important aspect of such predictions is the ability to evaluate strength of columns at elevated temperatures. Columns are critical structural elements, and failure of columns can lead to collapse of a structure. One of the critical factors affecting the strength of steel columns at elevated temperatures is the influence of material creep. Under fire conditions, steel columns can exhibit creep buckling, a phenomenon in which the critical buckling load for a column depends not only on slenderness and temperature, but also on duration of applied load.

The objective of this research is to better understand the phenomenon of creep buckling of ASTM A992 steel columns at elevated temperatures and to develop methods to predict creep buckling behavior. Analytical solutions using the concept of time-dependent tangent modulus are developed to model creep buckling behavior of steel columns at elevated temperatures. Computational creep buckling analyses are also performed in Abaqus®. Both analytical and computational methods utilize material creep models for structural steel developed by Harmathy, by Fields and Fields, and by the investigators.

As part of the experimental program, material characterization tests have been conducted at temperatures up to 1000 °C to evaluate tensile and creep properties of ASTM A992 steel at elevated temperatures. Moreover, W4×13 wide flange columns will soon be tested under pin-end conditions, modeled using knife-edges, to further verify analytical and computational creep buckling predictions.

Column testing frame and furnace

Imperfection Effects on the Strength of the Steel Girders

Mahdi Asadnia & Kim Roddis
George Washington University

The effect of plate imperfections on stability and strength of steel girders is being investigated in this study. Steel plates have been modeled with various lengths, boundary conditions and element types using ANSYS finite element software. Based on the sensitivity analysis, models made of shell elements capture the buckling behavior with fewer number of elements and less analysis time.

The 1st linear buckling modes, compatible with loading and boundary conditions were used as the imperfection pattern.

Fig. 1 shows the buckling deformations of a steel plate. The (1m x 1m) square steel plate had sequential boundary conditions around the edges consisting of clamped, simply supported, free, and simply supported (CSFS). A linear edge load was applied along the simply supported edges.

MASTAN2 software is used to perform the 1st order, 2nd order, elastic and inelastic analysis for comparison and verification of member behavior of ANSYS modeled built-up plate girders. Investigation of the effects of web and flange imperfections on the steel girders strength using MASTAN2 software and ANSYS software is underway.

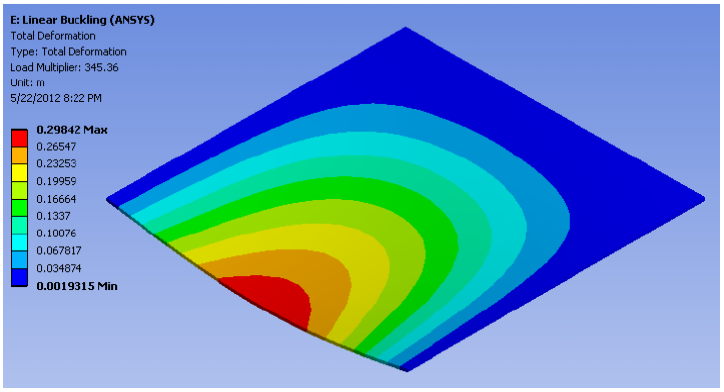


Fig. 1 Buckled shape of a 1m by 1m CSFS steel plate

Improved Cross Frame Details

Anthony Battistini, Wei Wang, Sean Donahue, Todd Helwig, Mike Engelhardt, & Karl Frank
The University of Texas at Austin; Sponsored by Texas Department of Transportation

Cross frames are critical to the stability of straight and curved steel bridges. In order to be considered an effective brace, the cross frame must meet both strength and stiffness requirements. Often, the cross frames are fabricated using single angle members to create an X-type or K-type configuration. The research team at Ferguson Structural Engineering Laboratory has been investigating the strength and stiffness of these systems, as well as the performance of a proposed Z-type orientation using double angle or tubular members.

The large-scale cross frame stiffness tests showed the current equations for the torsional stiffness of the cross frame may not be appropriate for design. The X-type brace is often designed using a tension-only concept, which ignores the contribution of the compression diagonal. When examining the experimental data, it was found the compression diagonal does contribute to the stiffness, but because the single angle members are loaded eccentrically, a large reduction in both member and system stiffness occurs.

However, using the Z-type brace with the concentrically loaded HSS members, the tension-only formulation for brace stiffness provides a good approximation. A test using double angles with the Z-type brace is planned for the fall semester. In addition, full-scale fatigue tests of the cross frames are underway to better determine the fatigue rating of the single angle connection, as well as the proposed double angle and HSS knife-plate connections.

X-type single angle cross frame at ultimate failure

Z-type cross frame with double angle members

Eccentrically-loaded single angle introduces significant bending

Energy Dissipation of Cold-Formed Steel Framing Members

David Padill-Llano, Cristopher Moen, & Matthew Eatherton
Virginia Polytechnic Institute and State University; Sponsored by American Iron & Steel Institute; Virginia Tech; Steel Stud Manufacturers Association; & ClarkDietrich Building Systems

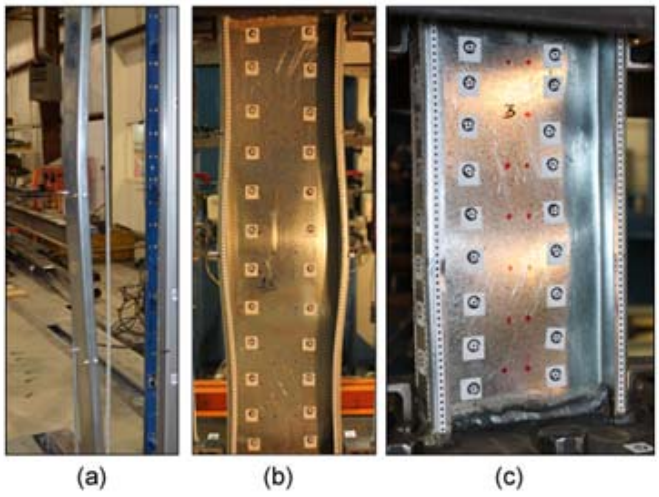


Fig. 1 Axial buckling: (a) global, (b) distortional, and (c) local

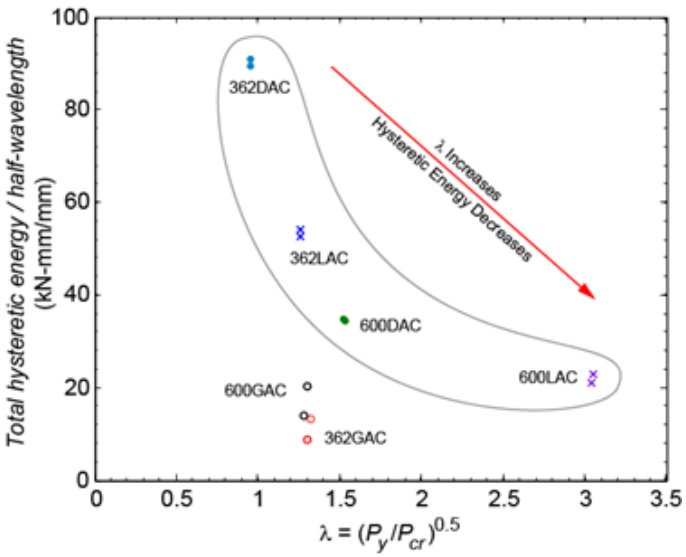


Fig. 2 Total hysteretic energy vs. slenderness

Current design of cold-formed steel (CFS) lateral load resisting systems for buildings is conducted using prescriptive design tables based on the subassemblage tests. Although this design method is expected to provide adequate protection against collapse during earthquakes, it provides little information about the seismic behavior of the actual CFS structures. Actual CFS buildings include odd geometry, load transfer mechanisms not included in tests, and many gravity members and connections. To facilitate performance based earthquake engineering of CFS structures, and to better understand their expected behavior, it is necessary to develop accurate and computationally efficient models of CFS elements, assemblages and connections. Understanding the cyclic behavior of the individual components is necessary to develop such models.

An experimental program undergoing at Virginia Tech is aimed to characterize the cyclic behavior of CFS axial and flexural members. In the completed phase, CFS C-shaped axial members susceptible to global, distortional, and local buckling (Fig.1) were subjected to cyclic axial displacement histories.

Results show a clear correlation between cross-sectional slenderness and energy dissipated within the damaged half-wavelength (Fig.2) consistent with previous studies. Higher damage occurred for members experiencing inelastic buckling along with short energy dissipation life. Fracture in tension occurs sooner for these members. Post-buckling energy dissipation could be beneficial in an earthquake, especially for those specimens with intermediate cross-sectional slenderness that experienced inelastic local or distortional buckling. Pinching hysteretic models are being calibrated to capture cyclic energy dissipation, strength degradation, and stiffness degradation of these members (Fig. 3).

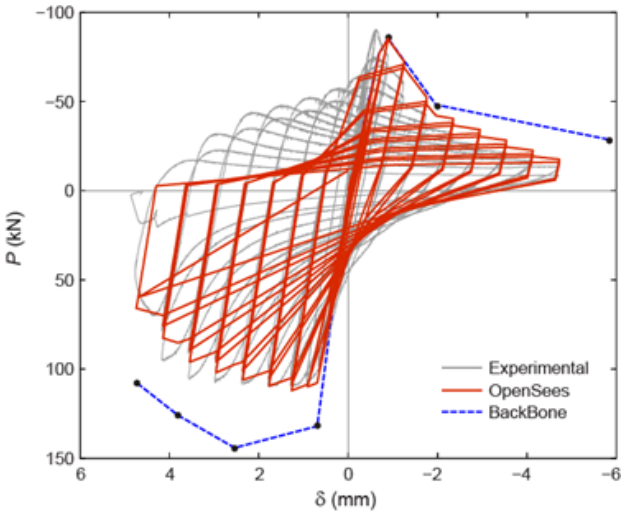


Fig. 3 Calibrated hysteretic model

2013 Conference Advanced Program Tuesday, April 16 (annual meeting) through Friday, April 19

SS1: Tu 2:00-3:30 Technical Presentations: Topics in Stability Research (Moderator: Benjamin Schafer)

Intermediate Tranverse Stiffeners in Stiffened Plate Girders

Darko Beg, Franc Sinur, University of Ljubljana, Ljubljana, Slovenia

Compression Members with Hollow Sections and Concentric Slotted Gusset Plates - Behaviour and Recommended Design Model

Harald Unterweger, Andreas Taras, Graz University of Technology, Graz, Austria

Design of Steel Joists Under Non-uniform Loading Using Virtual Joist Tables

Stephen Kilber, Andrea Surovek, South Dakota School of Mines and Technology, Rapid City, SD, Joe Pote, New Millennium Building Systems, Lake City, FL, USA

The Overall Interaction Concept: an Alternative Approach to the Stability and Resistance of Steel Sections and Members

N. Boissonnade, J. Nseir, University of Applied Sciences of Western Switzerland- Fribourg, Fribourg, Switzerland, E. Saloumi, Ecoloe Superieure d'Ingenieurs de Beyrouth, Beyrouth, Lebanon

SS2: Tu 3:45-5:05 Technical Presentations: Stability of Steel Shear Walls (Moderator: Ronald Ziemian)

The Post-Buckling Strength and Tension-Field Action Mechanism of Cold-Formed Steel Shear Walls with Steel Sheeting

Saeed Mohebbi, Seyed Rasoul Mirghaderi, Farhang Farahbod, Shahabeddin Torabian, University of Tehran, Tehran, Iran

Analytical Model for Stiffened Steel Infill Plates

S. Sabouri, S. Mamazizi, K.N. Toosi University of Technology, Tehran, Iran

Effective Strip Method for Cold-Formed Steel Shear Wall using Steel Sheet Sheathing

N. Yanagi, C. Yu, University of North Texas, Denton, TX, USA

Elastic Compressive Strength of Aluminum Circular-Arc Cross Sections

C. Shepherd, Virginia Tech, Blacksburg, VA, R. Ziemian, Bucknell University, Lewisburg, PA, USA

ANNUAL MEETING (4/16/2013) FROM 2PM T0 8PM, INCLUDES PRESENTATION, GROUP MEETINGS, AND SSRC SOCIAL HOUR

SS3: Tu 5:15-6:00 Task Group Meetings: Parallel Breakout Sessions for Task

Table 1: TG02 Members: stability of steel members

Chair: Don White

Table2: TG03 Systems: stability of steel systems, especially frames

Chair: Chris Foley

SS4: Tu 5:50-7:00 Task Group Meetings: Parallel Breakout Sessions for Task Groups

Table 1: TG04: Stability of metal bridges and bridge components

Chair: Dan Linzell Vice-Chair: Qiuhong Zhao

Table 2: TG05 Thin-walled: Stability of thin-walled metal structures

Chair: Cris Moen, Vice-Chair: Cheng Yu

Table 3: TG06 Extreme Loads: stability under extreme loads, seismic, fire,

Co-Chairs: Amit Varma, Robert Tremblay

SS5: Tu 7:05-7:15 SSRC Annual Business Meeting

SS6: Tu 7:15-8:00 SSRC Social Hour

2013 Conference Advanced Program Tuesday, April 16 (annual meeting) through Friday, April 19

S1: W 3:15-4:15 Stability Under Fire Conditions (Moderator: Ronald Ziemian)

Welcome to the 2013 SSRC Annual Stability Conference

R. Ziemian, Bucknell University, Lewisburg, PA, USA

Performance of Steel Shear Tab Connections at Elevated Temperatures

M. Seif, T. McAllister, National Institute of Standards and Technology, Gaithersburg, MD

Elastic Stability of Cold-Formed Steel Compression Members under Thermal Gradients

J.C. Batista-Abreu, B. W. Schafer, Johns Hopkins University, Baltimore, MD

S2: W 4:30-6:00 Stability of Web Tapered Members (Moderator: Clarence Miller)

Shear Strength of Web-Tapered I-Shaped Members

Ryan Paul Studer, Columbus, GA

Mapping Web-Tapered Member to a Prismatic Member for Buckling Analysis of Sway Frames-Closed Form Equation

Emad S. Salem, Al-Azhar University, Cairo, Egypt

Cyclic Lateral-Torsional Buckling Experiments on Web-Tapered I-beams

Matthew D. Smith, U.S. Army Corps of Engineers, Vicksburg, MS, Kyle A. Turner, Chia-Ming Uang, University of California San Diego, La Jolla, CA

Stability Verification of Web Tapered Beam Colums- Possible Approaches and Open Questions

Liliana Marques, Luis Simoes da Silva, Carlos Rebelo, University of Coimbra, Coimbra, Portugal

SSRC SESSIONS S1-S11 ARE PART OF THE NASCC

S3: TH 8:00-9:30 Stability of Frames & Systems (Moderator: Dinar Camotim)

On Frame Stability Analysis

A.S. Doria, Petrobras, Brazil, M.Malite, University of Sao Paulo, Sao Paulo, Brazil, L.C.M. Vieira, Jr., University of New Haven, West Haven, CT

An Experimental and Analytical Study on Failure Modes of Structural Steel Scaffolds

Maheeb M.E. Abdel-Ghaffar, Abdullah N.S. Mahmoud, Cairo University, Cairo, Egypt

Analysis of Locally or Distortionally Buckled Frames

Xi Zhang, Kim J.R. Rasmussen, University of Sydney, Sydney, Australia

System Reliability of Steel Frames Designed by Inelastic Analysis

Shabnam Shayan, Kim J.R. Rasmussen, Hao Zhang, Bruce Ellingwood, University of Sydney, Sydney, Australia

2013 Conference Advanced Program Tuesday, April 16 (annual meeting) through Friday, April 19

S4: Th 10:00-11:30 Cold Formed Steel Member Stability (Moderator: Roger LaBoube)

Buckling Strength of Axially Loaded Cold Formed Built-Up I-Sections

Metwally Abu-Hamd, Cairo Univeristy, Giza, Egypt

Elastic Buckling Prediction of Cold-Formed Steel Columns with Periodic Perforation

F.H. Smith, C.D. Moen, Virginia Tech, Blacksburg, VA

Distortional Post-Buckling Strength of Cold-Formed Steel Columns: How do the Cross-Section Geometry and Support Conditions Affect it?

Alexandre Landesmann, Federal University of Rio de Janeiro, Rio de Janeiro, Brazil, Cilmar Basaglia, University of Sao Paulo, Sao Paulo, Brazil, Dinar Camotim, Technical University of Lisbon, Lisbon, Portugal

Shape Optimization of Cold-Formed Steel Columns with Manufacturing Constraints and Limited Number of Rollers

J. Leng, Z. Li, J.K. Guest, B.W. Schafer, Johns Hopkins University, Baltimore, MD

S5: Th 1:15-2:15 Stability Bracing (Moderator: Luiz Viera)

Bracing Demands in Cold-Formed Steel Framed Walls

H.B. Blum, B.W. Schafer, Johns Hopkins University, Baltimore, MD

Brace Forces for X-Type, K-Type, and Z-Type Cross Frames in Steel I-Girder Bridge Systems

Anthony Battistini, University of Texas at Austin, Austin, TX, Weihua Wang, SBM Offshore, Houston, TX, Todd Helwig, Michael Engelhardt, University of Texas at Austin, Austin, TX, Karl Frank, Hirschfeld Industries, Austin, TX

Practical Design of Complex Stability Bracing Configurations Using Computational Software Tools

Cliff D. Bishop, Donald W. White, Georgia Institute of Techonogy, Atlanta, GA

SSRC SESSIONS S1-S11 ARE PART OF THE NASCC

S6: Th 3:00-4:00 Stability of Steel Bridge Systems (Moderator: Pete Birkemoe)

Calculating the Impact of Partial Warp Restraint on Steel Girder Elastic Buckling Strength

Craig Quadrato, Kevin Arnett, United States Military Academy, West Point, NY

Analytical Assessment of the Strength of Steel Truss Bridge Gusset Plates

Y.D. Kim, Y. Mentes, D.W. White, R.T. Leon, Georgia Institute of Technolgy, Atlanta, GA

Axial Capacity of Partially Corroded Steel Bridge Piles

H. Karagah, M. Dawood, University of Houston, Houston, TX

2013 Conference Advanced Program Tuesday, April 16 (annual meeting) through Friday, April 19

SSRC SESSIONS S1-S11 ARE PART OF THE NASCC

S7: Th 4:15-5:15 Stability Under Seismic & Other Lateral Loads (Moderator: Dan Linzell)

Role of Model Fidelity in Predicting the Seismic Response of Cold-Formed Steel Buildings

J. Leng, B.W. Schafer, Johns Hopkins University, Baltimore, MD, S.G. Buonopane, Bucknell University, Lewisburg, PA

Flexural Hysterectic Response of Cold-Formed Steel C-Section Framing Members

D.A. Padilla-Liano, C.D. Moen, M. Eatherton, Virgina Tech, Blacksburg, VA

Strain Capacity of Cross-Section Elements and the Role of Local Slenderness in the Rotation Capacity of Structural Steel

S. Torabian, University of Tehran, Tehran, Iran, B.W. Schafer, Johns Hopkins University, Baltimore, MD

S8: F 8:00-9:30 Stability of Angles, Cruiciform, & Z-Shaped Members (Moderator: LeRoy Lutz)

Towards a More Rational DSM Design Approach for Angle Columns

Pedro Borges Dinis, Dinar Camotim, Technical University of Lisbon, Lisbon, Portugal

Numerical and Experimental Investigation on the Post-Buckling Behavior, Ultimate Strength and DSM Design of Thin-Walled Cruciform Steel Columns

Pedro Borges Dinis,Technical University of Lisbon, Lisbon, Portugal, Perry Green, Bechtel Power Corporation, Frederick, MD, Dinar Camotim, Technical University of Lisbon, Lisbon, Portugal

Distortional Buckling Capacity of Z-Purlins Through-Fastened to Metal Panels Under Gravity Loading

C.N. Grey, Simpson Gumpertz & Heger Inc., Waltham, MA, C.D. Moen, Virginal Tech, Blacksburg, VA

Strength and Stiffness of Cold-Formed Steel Purlins with Sleeve and Overlap Bolted Connections

A.H. Favero Neto, University of Sao Paulo, Sao Paulo , Brazil, L.C.M. Vieira, Jr., University of New Haven, West Haven, CT, M. Malite, University of Sao Paulo, Sao Paulo, Brazil

S9: F 10:00-11:30 Beedle Presentation Session (Moderator: Benjamin Schafer)

Beedle Presentation:

Are Designers Sufficiently Instructed to Make the Most Rewarding Use of the Latest Steel Codes?

R. Maquoi, Liège University, Liège Belgium.

Session talks

Study of Residual Stresses in I-Section Members and Cellular Members

D. Sonck, R. Van Impe, Ghent University, Zwijnaarde, Belgium

Combining Buckling Mode Shapes to Simulate Geometric Imperfections in Cold-Formed Steel Members

V.M. Zeinoddini, B.W. Schafer, Johns Hopkins University, Baltimore, MD

2013 Conference Advanced Program Tuesday, April 16 (annual meeting) through Friday, April 19

S10: F 2:15-3:15 Advances in Stability Analysis & Design (Moderator: Donald Sherman)

GBT-Based Structural Analysis of Elastic-Plastic Thin-Walled Members

Miguel Abambres, Dinar Camotim, Nuno Silvestre, Technical University of Lisbon, Lisbon, Portugal

Finite Strip Elastic Buckling Analysis of Steel Foam Sandwish Members

Z. Li, S. Szyniszewski, Johns Hopkins University, Baltimore, MD

Stability, Behaviour and Design of I-Section Steel Members Subjected to Major-Axis Bending and Tension

Joao T.M. Silva, Technical University of Lisbon, Lisbon, Portugal, Joanna Nsier, University of Applied Sciences of Western Switzerland- Fribourg, Fribourg, Switzerland, Dinar Camotim, Technical University of Lisbon, Lisbon, Portugal, Nicolas Boissonnade, University of Applied Sciences of Western Switzerland- Fribourg , Fribourg, Switzerland

S11: F 3:30-5:00 Vinnakota Award Session & Stability of Plates, Shells, and Girder Webs (Moderator: Perry Green)

SSRC SESSIONS S1-S11 ARE PART OF THE NASCC

New Idea: Girders with Honey-Comb Structured Web

Hartmut Pasternak, Susanne Bartholome, Brandenburg University of Technology, Cottbus, Germany

Shell Buckling Evaluation of Thin-Walled Steel Tanks Filled at Low Liquid Level According to Current Design Codes

Chrysanthos Maraveas, C. Maraveas Partnership, Athens, Greece, Konstantinos Miamis, University of Manchester, UK

Localized Web Buckling of Double-Coped Beams

Bo Dowswell, Robert Whyte, SDS Resources, Birmingham, AL

Numerical and Experimental Investigation on the Post Buckling Behavior of Steel Plate Girders Subjected to Shear

S. Mamazizi, R. Crocetti, H. Mehri, Lund University, Lund, Sweden