

01 Aug 1998

CCFSS Technical Bulletin August 1998

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Recommended Citation

Wei-Wen Yu Center for Cold-Formed Steel Structures, "CCFSS Technical Bulletin August 1998" (1998).
CCFSS Technical Bulletins (1993 - 2020). 40.
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Abstracts of Conference Papers

During October 15-16, 1998 the 14th International Specialty Conference on Cold-Formed Steel Structures will be held in St. Louis, Missouri. The following are brief summaries of the 40 papers to be presented and discussed at the conference.

1. "Laterally Braced Cold-Formed Steel Flexural Members with Edge Stiffened Flanges," by B.W. Schafer and T. Pekoz
This paper presents new procedures for predicting the buckling stress in the local and distortional mode. The method integrates distortional buckling into the unified effective width approach currently used in most cold-formed steel design specifications.
2. "Distortional Buckling Formulae for Thin Walled Channel and Z-Sections with Return Lips," by M.R. Bambach, J.T. Merrick, and G. J. Hancock
This paper describes general formulations for computing the elastic distortional buckling stresses of channel and Z-sections with return lips. The accuracy of the formulations is compared with the test results for a large range of section geometries using a finite strip buckling analysis
3. "A Simplified Model for Distortional Buckling of Channels and Zees in Flexure," by D.S. Ellifritt, R. L. Glover, and J. D. Hren
This paper presents a simplified expression for calculating distortion buckling strengths of channels and zees subjected to bending. Full-scale tests were performed on channels and zees for verifying the analytical results.
4. "Buckling Mode Interaction in Cold-Formed Steel Columns and Beams," by J.M. Davies, C. Jiang, and V. Ungurean
This paper makes particular use of the Generalized Beam Theory (GBT) in assessing the influence of local buckling and distortional buckling on lateral-torsional buckling and the interaction of compression force and bending moment. The analyses using GBE are compared with the available test results.
5. "Direct Strength Prediction of Cold-Formed Steel Members Using Numerical Elastic Buckling Solutions," by B.W. Schafer and T. Pekoz
This paper presents a "direct strength" approach as a reliable alternative to the current design of cold-formed steel members. The use of numerical elastic buckling solutions leads to a complete flexibility in cross section geometry, thus greatly increasing the ability to optimize cold-formed steel members.
6. "Bending Tests of Hat Sections with Multiple Longitudinal Stiffeners," by V.V. Acharya and R.M. Schuster
This paper discusses a test program on hat sections with multiple longitudinal stiffeners. Results of bending tests are compared with the 1994 Canadian Standard and the 1996 edition of the AISI design specification.
7. "Analysis of Hat Sections with Multiple Intermediate Longitudinal Stiffeners," by V.V. Acharya and R.M. Schuster
This paper presents the analysis associated with the test program on hat sections with multiple intermediate longitudinal stiffeners. An alternate design method for determining the bending strength of cold-formed steel members is proposed in the paper.
8. "A Non-Linear Design Model for Continuous Multi-Span Light Gauge Sheeting and Members," by L. Sokol
This paper discusses a non-linear design model for continuous multiple-span steel sheeting and members taking into account the relationships between moment, reaction and hinge rotation at internal supports. An improved approach to the behavior at the internal support is proposed.
9. "Shear Plus Bending in Lipped Z-Purlins," by K. Almoney and T.M. Murray
This paper discusses the limit state of shear plus bending for continuous lapped Z-purlin systems. The current AISI specification provisions are verified by the results of three-span continuous Z-purlin tests.
10. "Web Crippling Behaviour of Cold-Formed Unlipped Channels" by B. Young and G.J Hancock
This paper discusses the web crippling strengths of cold-formed steel unlipped channels. The test results are compared with the AISI Specification and the Australian/New Zealand Standard. Plastic mechanism formulas are proposed for the sections tested in this program.
11. "Web Crippling of Cold-Formed Steel Members" by K. Prabakaran and R.M. Schuster
This paper discusses the development of the design expressions for web crippling of cold-formed steel members, which are used in the 1994 edition of the Canadian Standard. The statistical analysis is based on the test data from Canada, the United States, Sweden, and France.

12. "Web Crippling of Single Web Cold Formed Steel Members Subjected to End One-Flange Loading," by R. R. Gerges and R.M. Schuster
This paper presents an experimental investigation of the web crippling behavior of cold-formed steel C-sections subjected to end one-flange loading with particular emphasis on large inside bend radius-to-thickness ratios. Design expressions are proposed for the North American Design Standard.
13. "Web Crippling of Members Using High-Strength Steels," by S.Wu, W.W. Yu, and R.A. LaBoube
This paper presents the experimental investigation on the web crippling strength of panels using high-strength, low-ductility sheet steels. The results of 148 web crippling tests are compared with the current AISI Specification.
14. "Columns Under Loads of Varying Eccentricity," by J. Rhodes
A series of tests on small lipped channel columns with varying degrees of eccentricity is reported in this paper. The predictions using the AISI Specification, the British Standard, and the Eurocode are compared with experimental results.
15. "Behaviour of Locally Buckled Singly Symmetric Columns," by B. Young and K.J.R. Rasmussen
An experimental investigation into the behavior of locally buckled cold-formed steel plain and lipped channel columns with fixed and pinned ends is presented in this paper. The purpose of the paper is to demonstrate experimentally the different effects of local buckling on the behavior and strength of fixed- and pin- ended channels.
16. "Tests of Cold-Formed Channel Columns," by B. Young and K.J.R. Rasmussen
This paper presents a series of tests of cold-formed steel channel columns. The purpose of the paper is to compare the test results with Australian/New Zealand, American and European Specifications and to propose recommendations for the design of fixed- ended channel columns.
17. "Shift of the Effective Centroid of Channel Columns," by B. Young and K.J.R. Rasmussen
This paper discusses the recent tests on fixed-ended channel columns which are used to obtain values of the shift of the effective centroid. The shift of the effective centroid as predicted by the AISI Specification and the AS/NZS Standard is compared with the tests of lipped channels.
18. "A European Design Code for Pallet Racking," by J.M. Davies and M.H.R. Godley
This paper introduces the new European design code for pallet racking and compares it with the Rack Manufacturers Institute (RMI) Specification used in the United States.
19. "Experimental Procedures for Stub Column Tests," by Pu, M.H.R. Godley, and R. G. Beale
In this investigation, 36 stub columns were tested by using FEM and AISI procedures to investigate the difference in the ultimate load between these procedures. Based on the failure loads obtained from these tests, the AISI procedure is recommended as the standard procedure.
20. "Rotational Stiffnesses of Semi-Rigid Baseplates," by M.H.R. Godley, R. G. Beale, and X. Feng
This paper presents a test procedure to determine the rotational stiffness and moment-curvature relationships of semi-rigid baseplates of cold-formed steel structures. The influence of the modulus of the foundation subgrade on baseplate performance is determined.
21. "Frequently Asked Questions Concerning the AISI Base Test and the Use of the AISI Anchorage Equations," by J.M. Fisher, R.A. LaBoube, T.M. Murray, and J.N. Nunnery
The purpose of this discussion is to answer questions which have been raised by designers relative to the new provisions of the AISI 1996 Specification. These questions are related to the use of the "Base Test Method" and the application of the anchorage equations as they apply to the determination of the moment capacity of C- or Z- sections supporting a standing seam roof system.
22. "Study on Light Gauge Steel Trusses with Rosette Connections," by P. Makelainen, J. Kesti, O. Kaitila, and K.J. Sahramaa
This paper discusses the Rosette-joining system and its use in roof-truss structures. The test program is described and the test results are compared with the AISI 1996 Specification supported by a distortional buckling analysis according to the Australian/New Zealand Standard and FE analysis results.
23. "Seismic Design of Light Gauge Steel Structures: A Discussion," by R.L. Serrette
This paper discusses recent developments in the design of vertical lateral load resisting assemblies for light gauge steel framed structures. Arguments for the need of detailed analysis to test results based on energy calculations and evaluation of system options for low seismic zones are presented.
24. "Testing of Cold-Formed Steel Floor Joists with Bearing Stiffeners," by S.R. Fox and R.M. Schuster
This paper discusses 82 tests of web-stiffened C-section joist specimens. The test results were compared with the current CSA standard and AISI Specification.

25. "Fire Resistance on Bearing Wall Using Steel & Gypsum," by I.K. Kwon, K. Choi, and N.Y. Jee
This paper describes the fire-resistance tests conducted for the load bearing wall systems using cold-formed steel studs and gypsum board. The full-scale tests were carried out under loading and unloading conditions.
26. "A Study on the Flexural Behavior of Profiled Composite Beams," by G.R. Yang, Y.S. Hwang, and Y.B. Kwon
This paper discusses an analytical study on the behavior of composite beams which are composed of cold-formed steel sheeting and concrete. Two formulas are proposed for the nonlinear moment-curvature relationship of the composite beam.
27. "Cold-Formed Shear Connectors for Composite Constructions," by M. Malite, W.A. Nimir, J. J. de Sales, and R.M. Goncalves
This paper presents the results of an experimental analysis using two types of connectors to evaluate the strength and load-slip behavior. The experimental results were compared with the theoretical values.
28. "Ductility Measurement of Thin G550 Sheet Steels," by C.A. Rogers and G.J. Hancock,
This paper provides a summary of results detailing the ductility and net cross-section tensile resistance of high strength, low-ductility sheet steels tested as solid and perforated coupons. Material properties are compared with previous work and the limit states tensile design equations are calibrated according to the AISI procedure.
29. "Technique and Qualities of Beams with Expanded Metal Sections," by M. Hellsten
This paper describes the rotary expander technique used for manufacturing lattice framework from a single strip of sheet metal by integrating expanded metal with solid sheet. This technique can be used to distribute the material in a tubular, or open profile to where it's best needed.
30. "Accelerated Test Development for Coil-Coated Steel Building Panels," by K.M. Lawson, H.H. Lawson, H.E.G. Rommal, and A.C. Tiburcio
This paper discusses the experimental work and the preliminary findings of a project designed to establish an accelerated laboratory test that would rank coating system performance and the performance in atmospheric exposure. The work includes the program design and implementation and preliminary correlations of the three-year atmospheric exposure results to several accelerated test methods.
31. "Understanding Pullover," by J.S. Kreiner and D.S. Ellifritt
This paper discusses the additional research work on pullover. The purpose of the research was to provide a better understanding of pullover by determining a reduction factor for the standard test and AISI Specification equation.
32. "Bearing Design of Thin Sheet Steel Screwed Connections," by C.A. Rogers and G.J. Hancock
This paper provides a summary of results detailing the behavior of screwed connections tested in shear which have failed in the bearing and bearing/tilting modes. Design formulation is proposed for shear resistance of screwed connections which fail in this condition.
33. "Behaviour of Thin G550 Sheet Steel Screwed Connections," by C.A. Rogers and G.J. Hancock
This paper provides a summary of test results on the behaviour of screwed connections tested in shear which were composed of thin G550 and G300 sheet steels. Recommendations concerning the adequacy of current design standards with respect to the design of thin sheet steel screwed connections are made.
34. "Lateral Load Strength of Screw Connections in 29 Ga Metal," by G. A. Anderson and V.C. Kelley
The results of 300 tests on screw connections in shear are presented in this paper. A regression equation is developed for tilting and compared with the AISI equation and other available test data.
35. "Behaviour of Thin G550 Sheet Steel Bolted Connections," by C.A. Rogers and G.J. Hancock
This paper provides a summary of test results on the behavior of bolted connections tested in shear, which were composed of thin sheet steels. Recommendations concerning the adequacy of current design standards with respect to the design of thin sheet steel bolted connections are made.
36. "Factors Influencing the Strength of Mechanical Clinching," by R. Pedreschi, B. Sinha, R. Davies, and R. Lennon
This paper describes the key characteristics of mechanical clinching, illustrated using some typical, practical applications. The effects of various factors on the strength of connections are discussed in detail.
37. "Spacing of Connections in Compression Flanges of Built-Up Cold-Formed Steel Beams," by R.A. LaBoube, W.W. Yu, and M. L. Jones
This paper summarizes the results of a recent study to determine if the current AISI spacing criteria accurately predicts the capacity of built-up sections with cover plate in compression. An analytical procedure was developed to compute the moment capacity for a range of spacings.

38. "Compressional Behaviour of Stainless Steel Short Struts," by M. Macdonald, J. Rhodes, and G. T. Taylor
This paper describes the results obtained from a series of axial compression tests performed on short strut members of plain channel cross section cold-formed Type 304 stainless steel sheet. It also discusses the effects of cold-forming on the load capacity of the channels.
39. "The Local Buckling Strength of Partially Stiffened Type 3CR12 Stainless Steel Compression Elements in Beam Flanges," by G.J. van den Berg,
This paper presents the results of a study on the effect of the non-linear behavior of Type 3CR12 stainless steels on the local buckling strength of partially stiffened compression elements in beam flanges. The test results were compared with the current design standards.
40. "The Effect of Cold-Forming on Type 3CR12 Square Tubes," by R. Laubscher
This paper illustrates the usefulness of the non-linear finite element method in predicting how the material properties change during cold-forming and gives a useful insight in what the actual condition of the material is after cold-forming.

CALENDAR

September 21-23, 1998

SSRC Annual Technical Session and Meeting
Atlanta, GA
Contact: (610) 758-3522

October 21-22, 1998

Meeting of the AISI Committee on Framing Standards
San Diego, CA
Contact: (202) 452-7215

February 24-25, 1999

International Conference on Steel and Composite Structures
Delft, The Netherlands
Contact: (+31) 20-679-32-18

October 15-16, 1998

14th International Specialty Conference on Cold-Formed Steel Structures
St. Louis, MO
Contact: (573) 341-4132 or (573) 341-4471

December 2-5, 1998

2nd International Conference and Workshop on Thin-Walled Structures
Singapore
Contact: (+65) 772-2288

June 20-23, 1999

4th International Conference on Steel and Aluminum Structures
Espoo, Finland
Contact: (+358) 9-451-3780

October 20-22, 1998

MetalCon International
San Diego, CA
Contact: (312) 201-0193

February 18-20, 1999

Meeting of the AISI Committee on Specifications
Las Vegas, NV
Contact: (202) 452-7130

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