

REFERENCES, BIBLIOGRAPHY, AND ACRONYMS

This section contains references, additional bibliography and acronyms that are generally common to the set of reports, FEMA-350, FEMA-351, FEMA-352, and FEMA-353. Following the regular references are three sections containing ASTM Standards published by the American Society for Testing and Materials, West Conshohocken, Pennsylvania and listed numerically, AWS Specifications published by the American Welding Society, Miami, Florida, and listed numerically, FEMA Reports published by the Federal Emergency Management Agency, Washington, DC, and listed by report number, and SAC Reports published by the SAC Joint Venture, Sacramento, California, and listed by report number.

References and Additional Bibliography.

- AISC, 1985, *Specification for Structural Joints using ASTM A325 or A490 Bolts*, American Institute of Steel Construction, Chicago, Illinois.
- AISC, 1989, *Manual of Steel Construction*, ASD, Ninth Edition, American Institute of Steel Construction, Chicago, Illinois.
- AISC, 1993, 1997, *Load and Resistance Factor Design Specifications for Structural Steel Buildings*, American Institute of Steel Construction, Chicago, Illinois.
- AISC, 1994a, *Proceedings of the AISC Special Task Committee on the Northridge Earthquake Meeting*, American Institute of Steel Construction, Chicago, Illinois.
- AISC, 1994b, *Northridge Steel Update 1*, American Institute of Steel Construction, Chicago, Illinois.
- AISC, 1997, *Seismic Provisions for Structural Steel Buildings*, American Institute of Steel Construction, Chicago, Illinois.
- AISC, 1998a, *Load and Resistance Factor Design Specifications for Structural Steel Buildings*, American Institute of Steel Construction, Chicago, Illinois.
- AISC, 1998b, *LRFD Manual of Steel Construction*, 2nd Edition, American Institute of Steel Construction, Chicago, Illinois.
- AISC, 1999, *Supplement No. 1 to the 1997 Seismic Provisions for Structural Steel Buildings*, American Institute of Steel Construction, Chicago, Illinois.
- Allen, J., Partridge, J.E., Richard, R.M., and Radau, S., 1995, "Ductile Connection Designs for Welded Steel Moment Frames," *Proceedings, 64th Annual Convention*, Structural Engineers Association of California, Sacramento, California.
- Anderson, J, Duan, J., Xiao, Y., and Maranian, P., 2000, *Improvement of Welded Connections Using Fracture Tough Overlays*, Report No. SAC/BD-00/20, SAC Joint Venture, Sacramento, California.
- ASCE, 1998, ASCE-7 maps, American Society of Civil Engineers, Reston, Virginia.
- ASTM citations: see the list of ASTM Standards on page R-4.

- ATC, 1985, *Earthquake Damage Evaluation Data for California*, Report ATC-13, Applied Technology Council, Redwood City, California.
- ATC, 1987, *Evaluating the Seismic Resistance of Existing Buildings*, Report ATC-14, Applied Technology Council, Redwood City, California.
- ATC, 1989, *Procedures for Postearthquake Safety Evaluations of Buildings*, Report ATC-20, Applied Technology Council, Redwood City, California.
- ATC, 1992, *Guidelines for Cyclic Seismic Testing of Components of Steel Structures*, Report ATC-24, Applied Technology Council, Redwood City, California.
- ATC, 1995, *Addendum to the ATC-20 Postearthquake Building Safety Evaluation Procedures*, Report ATC-20-2, Applied Technology Council, Redwood City, California.
- ATC, 1997a, *Seismic Evaluation and Retrofit of Concrete Buildings*, prepared by the Applied Technology Council (Report No. ATC-40), for the California Seismic Safety Commission (Report No. SSC 96-01), Sacramento, California.
- ATC, 1997b, *NEHRP Guidelines for the Seismic Rehabilitation of Buildings*, Report No. FEMA-273, prepared by the Applied Technology Council for the Building Seismic Safety Council, published by the Federal Emergency Management Agency, Washington, DC.
- ATC, 1997c, *Commentary to NEHRP Guidelines for the Seismic Rehabilitation of Buildings*, Report No. FEMA-274, prepared by the Applied Technology Council for the Building Seismic Safety Council, published by the Federal Emergency Management Agency, Washington, DC.
- Avent, R., 1992, "Designing Heat-Straightening Repairs," *National Steel Construction Conference Proceedings*, Las Vegas, Nevada.
- AWS citations: see the list of AWS reports, specifications and codes on page R-5.
- Barsom, J.M., 1996, "Steel Properties — Effects of Constraint, Temperature, and Rate of Loading," *Proceedings of the 2nd US Seminar, Seismic Design, Evaluation and Retrofit of Steel Bridges*, San Francisco, Report No. UCB/CEE STEEL-96/09, Dept. of Civil and Environmental Engineering, UC Berkeley, pp.115-143.
- Boore, D.M., and Joyner, W.B., 1994, *Proceedings of Seminar on New Developments in Earthquake Ground-Motion Estimation and Implications for Engineering Design Practice*, Report ATC-35-1, Applied Technology Council, Redwood City, California, pp 6-1 to 6-41.
- BSSC, 1992, *NEHRP Handbook for the Seismic Evaluation of Existing Buildings*, developed by the Building Seismic Safety Council for the Federal Emergency Management Agency, Report FEMA-178, Washington, D.C.
- BSSC, 1997a, *1997 NEHRP Recommended Provisions for Seismic Regulations for New Buildings and Other Structures, Part 1 – Provisions*, prepared by the Building Seismic Safety Council for the Federal Emergency Management Agency (Report No. FEMA-302), Washington, DC.
- BSSC, 1997b, *1997 NEHRP Recommended Provisions for Seismic Regulations for New Buildings and Other Structures, Part 2 – Commentary*, prepared by the Building Seismic

- Safety Council for the Federal Emergency Management Agency (Report No. FEMA-303), Washington, DC.
- Campbell, K.W., and Bozorgnia, Y., 1994, "Near-Source Attenuation of Peak Horizontal Acceleration from Worldwide Accelerograms Recorded from 1957 to 1993," *Fifth U.S. National Conference on Earthquake Engineering, Proceedings*, Vol. III, pp 283-292, Earthquake Engineering Research Institute, Oakland, California.
- Chi, W.M., Deierlein, G., and Ingraffea, A., 1997, "Finite Element Fracture Mechanics Investigation of Welded Beam-Column Connections," SAC Joint Venture, Report No. SAC/BD-97/05.
- FEMA citations: see the list of FEMA reports on page R-6.
- Goel, R.K., and Chopra, A.K., 1997, "Period Formulas for Moment-Resisting Frame Buildings," *Journal of Structural Engineering*, Vol. 123, No. 11, pp. 1454-1461.
- Gross, J.L., Engelhardt, M.D., Uang, C.M., Kasai, K. and Iwankiw, N.R., 1999, *Modification of Existing Welded Steel Moment Frame Connections for Seismic Resistance, AISC Design Guide Series 12*, American Institute of Steel Construction, Chicago, Illinois.
- Grubbs, K., 1997, "The Effect of the Dogbone Connection on the Elastic Stiffness of Steel Moment Frames" Masters Thesis, Department of Civil Engineering, University of Texas at Austin.
- ICBO, 1988, 1991, and 1997, *Uniform Building Code, indicated edition*, International Conference of Building Officials, Whittier, California.
- ICC, 2000, *International Building Code*, International Code Council, Falls Church, Virginia.
- Kircher, C.A., Nassar, A.A., Kustu, O. and Holmes, W.T., 1997, "Development of Building Damage Functions for Earthquake Loss Estimation," *Earthquake Spectra*, Vol. 13, No. 4, Earthquake Engineering Research Institute, Oakland, California, pp. 663-682.
- Kircher, C.A., Reitherman, R.K., Whitman, R.V., and Arnold, C., 1997, "Estimation of Earthquake Losses to Buildings," *Earthquake Spectra*, Vol. 13, No. 4, Earthquake Engineering Research Institute, Oakland, California, pp. 703-720.
- Kircher, C.A., 1999, *Procedures for Development of HAZUS-Compatible Building-Specific Damage and Loss Functions*, National Institute of Building Sciences, Washington, D.C.
- Krawinkler, H., Gupta, A., Medina, R. and Luco, N., 2000, *Loading Histories for Seismic Performance Testing of SMRF Components and Assemblies*, Report No. SAC/BD-00/10, SAC Joint Venture, Sacramento, California.
- NIBS, 1997a, *HAZUS Earthquake Loss Estimation Methodology, Users Manual*, National Institute of Building Sciences, Washington, DC.
- NIBS, 1997b, *HAZUS Earthquake Loss Estimation Methodology, Technical Manual*, 3 Volumes. National Institute of Building Sciences, Washington, DC.
- RCSC, 1996, *Load and Resistance Factor Design: Specification for Structural Joints Using ASTM A325 or A490 Bolts*, Research Council on Structural Connections.

Richard, R., Partridge, J.E., Allen, J., and Radau, S., 1995, "Finite Element Analysis and Tests of Beam-to-Column Connections," *Modern Steel Construction*, Vol. 35, No. 10, pp. 44-47, American Institute of Steel Construction, Chicago, Illinois.

SAC citations: see the list of SAC Joint Venture reports on page R-7.

Shonafelt, G.O., and Horn, W.B, 1984, *Guidelines for Evaluation and Repair of Damaged Steel Bridge Members*, NCHRP Report 271, prepared by the National Cooperative Highway Research Program, for the Transportation Research Board, Washington, DC.

Wald, D.J., Quitoriano, T.H., Kanamori, H. and Scrivner, C.W., 1998, "Trinet Shakemaps – Rapid Generation of Peak Ground Motion and Intensity Maps for Earthquakes in Southern California", *SMIP98 Proceedings*, California Division of Mines and Geology, Sacramento, California.

Whitman, R., Anagnos, T., Kircher, C., Lagorio, H.J., Lawson, R.S., and Schneider, P., 1997, "Development of a National Earthquake Loss-Estimation Methodology," *Earthquake Spectra*, Vol. 13, No. 4, Earthquake Engineering Research Institute, Oakland, California, pp. 643-661.

Youssef, N.F.G, Bonowitz, D., and Gross, J.L., 1995, *A Survey of Steel Moment-Resisting Frame Buildings Affected by the 1994 Northridge Earthquake*, Report No. NISTR 56254, National Institute for Science and Technology, Gaithersburg, Maryland.

ASTM Standards.

ASTM Standards are published by the American Society for Testing and Materials, West Conshohocken, Pennsylvania, and are listed alphanumerically.

ASTM, 1997, *Standard Test Methods and Definitions for Mechanical Testing of Steel Products A6, Supplementary Requirement S5*

A36, *Specification for Carbon Structural Steel*

A325, *Specification for Structural Bolts, Steel, Heat-Treated, 120/105 ksi Minimum Tensile Strength*

A435, *Straight Beam Ultrasonic Examination of Steel Plates*

A490, *Specification for Heat-Treated Steel Structural Bolts, 150 ksi Minimum Tensile Strength*

A563, *Specification for Carbon and Alloy Steel Nuts*

A572, *Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel*

A898, *Straight Beam Ultrasonic Examination of Rolled Steel Structural Shapes*

A913, *Specification for High-Strength Low-Alloy Steel Shapes of Structural Quality, Produced by Quenching and Self-Tempering Process*

A992, *Standard Specification for Steel for Structural Shapes for Use in Building Framing*

E329, *Standard Specification for Agencies Engaged in the Testing and/or Inspection of Material Used in Construction*

E543, *Standard Practice for Agencies Performing Nondestructive Testing*
E548, *Standard Guide for General Criteria Used for Evaluating Laboratory Competence*
E994, *Standard Guide for Laboratory Accreditation Systems*
E1212, *Standard Practice for Establishment and Maintenance of Quality Control Systems for Nondestructive Testing Agencies*
E1359, *Standard Guide for Surveying Nondestructive Testing Agencies*
F436, *Specification for Hardened Steel Washers*
F959, *Specification for Compressible-Washer-Type Direct Tension Indicators for Use with Structural Fasteners*
F1554, *Specification for Anchor Bolts, Steel, 36, 55, and 105 ksi Yield Strength*
F1852, *Specification for “Twist-Off” Type Tension Control Structural Bolt/Nut/Washer Assemblies, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength*

AWS Reports, Specifications, and Codes.

AWS reports are published by the American Welding Society, Miami, Florida, and are listed alphanumerically.

AWS A2.4, *Standard Symbols for Welding, Brazing, and Nondestructive Testing*
AWS A4.3, *Standard Methods for Determination of the Diffusible Hydrogen Content of Martensitic, Bainitic, and Ferritic Steel Weld Metal Produced by Arc Welding*
ANSI/AWS A5.1-91, *Specification for Carbon Steel Electrodes for Shielded Metal Arc Welding*
ANSI/AWS A5.18-93, *Specification for Carbon Steel Electrodes and Rods for Gas Shielded Arc Welding*
ANSI/AWS A5.20-95, *Specification for Carbon Steel Electrodes for Flux-Cored Arc Welding*
AWS, 1995, *Presidential Task Group Report*
ANSI/AWS A5.5-96, *Specification for Low-Alloy Steel Electrodes for Shielded Metal Arc Welding*
ANSI/AWS A5.28-96, *Specification for Low-Alloy Steel Electrodes and Rods for Gas Shielded Arc Welding*
ANSI/AWS A5.23/A5.23M-97, *Specification for Low-Alloy Steel Electrodes and Fluxes for Submerged Arc Welding*
ANSI/AWS A5.25/A5.25M-97, *Specification for Carbon and Low-Alloy Steel Electrodes and Fluxes for Electroslag Welding*
ANSI/AWS A5.26/A5.26M-97, *Specification for Carbon and Low-Alloy Steel Electrodes for Electrogas Welding*
ANSI/AWS A5.32/A5.32M-97, *Specification for Welding Shielding Gases*

ANSI/AWS A5.17/A5.17M-97, *Specification for Carbon Steel Electrodes and Fluxes for Submerged Arc Welding*

ANSI/AWS A5.29-98, *Specification for Low-Alloy Steel Electrodes for Flux-Cored Arc Welding*

AWS D1.1-1998, 2000, *Structural Welding Code – Steel*

AWS D1.3, *Structural Welding Code*

AWS D1.4, *Structural Welding Code*

AWS QC1, *Standard for AWS Certification of Welding Inspectors*

FEMA Reports.

FEMA reports are listed by report number.

FEMA-178, 1992, *NEHRP Handbook for the Seismic Evaluation of Existing Buildings*, developed by the Building Seismic Safety Council for the Federal Emergency Management Agency, Washington, DC.

FEMA-267, 1995, *Interim Guidelines, Inspection, Evaluation, Repair, Upgrade and Design of Welded Moment Resisting Steel Structures*, prepared by the SAC Joint Venture for the Federal Emergency Management Agency, Washington, DC.

FEMA-267A, 1996, *Interim Guidelines Advisory No. 1*, prepared by the SAC Joint Venture for the Federal Emergency Management Agency, Washington, DC.

FEMA-267B, 1999, *Interim Guidelines Advisory No. 2*, prepared by the SAC Joint Venture for the Federal Emergency Management Agency, Washington, DC.

FEMA-273, 1997, *NEHRP Guidelines for the Seismic Rehabilitation of Buildings*, prepared by the Applied Technology Council for the Building Seismic Safety Council, published by the Federal Emergency Management Agency, Washington, DC.

FEMA-274, 1997, *NEHRP Commentary on the Guidelines for the Seismic Rehabilitation of Buildings*, prepared by the Applied Technology Council for the Building Seismic Safety Council, published by the Federal Emergency Management Agency, Washington, DC.

FEMA-302, 1997, *NEHRP Recommended Provisions for Seismic Regulations for New Buildings and Other Structures, Part 1 – Provisions*, prepared by the Building Seismic Safety Council for the Federal Emergency Management Agency, Washington, DC.

FEMA-303, 1997, *NEHRP Recommended Provisions for Seismic Regulations for New Buildings and Other Structures, Part 2 – Commentary*, prepared by the Building Seismic Safety Council for the Federal Emergency Management Agency, Washington, DC.

FEMA-310, 1998, *Handbook for the Seismic Evaluation of Buildings – A Prestandard*, prepared by the American Society of Civil Engineers for the Federal Emergency Management Agency, Washington, DC.

FEMA-350, 2000, *Recommended Seismic Design Criteria for New Steel Moment-Frame Buildings*, prepared by the SAC Joint Venture for the Federal Emergency Management Agency, Washington, DC.

FEMA-351, 2000, *Recommended Seismic Evaluation and Upgrade Criteria for Existing Welded Steel Moment-Frame Buildings*, prepared by the SAC Joint Venture for the Federal Emergency Management Agency, Washington, DC.

FEMA-352, 2000, *Recommended Postearthquake Evaluation and Repair Criteria for Welded Steel Moment-Frame Buildings*, prepared by the SAC Joint Venture for the Federal Emergency Management Agency, Washington, DC.

FEMA-353, 2000, *Recommended Specifications and Quality Assurance Guidelines for Steel Moment-Frame Construction for Seismic Applications*, prepared by the SAC Joint Venture for the Federal Emergency Management Agency, Washington, DC.

FEMA-354, 2000, *A Policy Guide to Steel Moment-Frame Construction*, prepared by the SAC Joint Venture for the Federal Emergency Management Agency, Washington, DC.

FEMA-355A, 2000, *State of the Art Report on Base Metals and Fracture*, prepared by the SAC Joint Venture for the Federal Emergency Management Agency, Washington, DC.

FEMA-355B, 2000, *State of the Art Report on Welding and Inspection*, prepared by the SAC Joint Venture for the Federal Emergency Management Agency, Washington, DC.

FEMA-355C, 2000, *State of the Art Report on Systems Performance of Steel Moment Frames Subject to Earthquake Ground Shaking*, prepared by the SAC Joint Venture for the Federal Emergency Management Agency, Washington, DC.

FEMA-355D, 2000, *State of the Art Report on Connection Performance*, prepared by the SAC Joint Venture for the Federal Emergency Management Agency, Washington, DC.

FEMA-355E, 2000, *State of the Art Report on Past Performance of Steel Moment-Frame Buildings in Earthquakes*, prepared by the SAC Joint Venture for the Federal Emergency Management Agency, Washington, DC.

FEMA-355F, 2000, *State of the Art Report on Performance Prediction and Evaluation of Steel Moment-Frame Buildings*, prepared by the SAC Joint Venture for the Federal Emergency Management Agency, Washington, DC.

SAC Joint Venture Reports.

SAC Joint Venture reports are listed by report number, except for SAC 2000a through 2000k; those entries that do not include a FEMA report number are published by the SAC Joint Venture.

SAC 94-01, 1994, *Proceedings of the Invitational Workshop on Steel Seismic Issues, Los Angeles*, September 1994, prepared by the SAC Joint Venture for the Federal Emergency Management Agency, Washington, DC.

SAC 94-01, 1994b, *Proceedings of the International Workshop on Steel Moment Frames, Sacramento*, December, 1994, prepared by the SAC Joint Venture for the Federal Emergency Management Agency, Washington, DC.

SAC 95-01, 1995, *Steel Moment Frame Connection Advisory No. 3*, prepared by the SAC Joint Venture for the Federal Emergency Management Agency, Washington, DC.

- SAC 95-02, 1995, *Interim Guidelines: Evaluation, Repair, Modification and Design of Welded Steel Moment Frame Structures*, prepared by the SAC Joint Venture for the Federal Emergency Management Agency, Report No. FEMA-267, Washington, DC.
- SAC 95-03, 1995, *Characterization of Ground Motions During the Northridge Earthquake of January 17, 1994*, prepared by the SAC Joint Venture for the Federal Emergency Management Agency, Washington, DC.
- SAC 95-04, 1995, *Analytical and Field Investigations of Buildings Affected by the Northridge Earthquake of January 17, 1994*, prepared by the SAC Joint Venture for the Federal Emergency Management Agency, Washington, DC.
- SAC 95-05, 1995, *Parametric Analytic Investigations of Ground Motion and Structural Response, Northridge Earthquake of January 17, 1994*, prepared by the SAC Joint Venture for the Federal Emergency Management Agency, Washington, DC.
- SAC 95-06, 1995, *Technical Report: Surveys and Assessment of Damage to Buildings Affected by the Northridge Earthquake of January 17, 1994*, prepared by the SAC Joint Venture for the Federal Emergency Management Agency, Washington, DC.
- SAC 95-07, 1995, *Technical Report: Case Studies of Steel Moment-Frame Building Performance in the Northridge Earthquake of January 17, 1994*, prepared by the SAC Joint Venture for the Federal Emergency Management Agency, Washington, DC.
- SAC 95-08, 1995, *Experimental Investigations of Materials, Weldments and Nondestructive Examination Techniques*, prepared by the SAC Joint Venture for the Federal Emergency Management Agency, Washington, DC.
- SAC 95-09, 1995, *Background Reports: Metallurgy, Fracture Mechanics, Welding, Moment Connections and Frame Systems Behavior*, prepared by the SAC Joint Venture for the Federal Emergency Management Agency, Report No. FEMA-288, Washington, DC.
- SAC 96-01, 1996, *Experimental Investigations of Beam-Column Subassemblages, Part 1 and 2*, prepared by the SAC Joint Venture for the Federal Emergency Management Agency, Washington, DC.
- SAC 96-02, 1996, *Connection Test Summaries*, prepared by the SAC Joint Venture for the Federal Emergency Management Agency, Report No. FEMA-289, Washington, DC.
- SAC 96-03, 1997, *Interim Guidelines Advisory No. 1 Supplement to FEMA-267 Interim Guidelines*, prepared by the SAC Joint Venture for the Federal Emergency Management Agency, Report No. FEMA-267A, Washington, DC.
- SAC 98-PG, *Update on the Seismic Safety of Steel Buildings – A Guide for Policy Makers*, prepared by the SAC Joint Venture for the Federal Emergency Management Agency, Washington, DC.
- SAC 99-01, 1999, *Interim Guidelines Advisory No. 2 Supplement to FEMA-267 Interim Guidelines*, prepared by the SAC Joint Venture, for the Federal Emergency Management Agency, Report No. FEMA-267B, Washington, DC.

SAC, 2000a, *Recommended Seismic Design Criteria for New Steel Moment-Frame Buildings*, prepared by the SAC Joint Venture for the Federal Emergency Management Agency, Report No. FEMA-350, Washington, D.C.

SAC, 2000b, *Recommended Seismic Evaluation and Upgrade Criteria for Existing Welded Steel Moment-Frame Buildings*, prepared by the SAC Joint Venture for the Federal Emergency Management Agency, Report No. FEMA-351, Washington, D.C.

SAC, 2000c, *Recommended Postearthquake Evaluation and Repair Criteria for Welded Steel Moment-Frame Buildings*, prepared by the SAC Joint Venture for the Federal Emergency Management Agency, Report No. FEMA-352, Washington, D.C.

SAC, 2000d, *Recommended Specifications and Quality Assurance Guidelines for Steel Moment-Frame Construction for Seismic Applications*, prepared by the SAC Joint Venture for the Federal Emergency Management Agency, Report No. FEMA-353, Washington, D.C.

SAC, 2000e, *A Policy Guide to Steel Moment-Frame Construction*, prepared by the SAC Joint Venture for the Federal Emergency Management Agency, Report No. FEMA-354, Washington, D.C.

SAC, 2000f, *State of the Art Report on Base Metals and Fracture*, prepared by the SAC Joint Venture for the Federal Emergency Management Agency, Report No. FEMA-355A, Washington, D.C.

SAC, 2000g, *State of the Art Report on Welding and Inspection*, prepared by the SAC Joint Venture for the Federal Emergency Management Agency, Report No. FEMA-355B, Washington, D.C.

SAC, 2000h, *State of the Art Report on Systems Performance*, prepared by the SAC Joint Venture for the Federal Emergency Management Agency, Report No. FEMA-355C, Washington, D.C.

SAC, 2000i, *State of the Art Report on Connection Performance*, prepared by the SAC Joint Venture for the Federal Emergency Management Agency, Report No. FEMA-355D, Washington, D.C.

SAC, 2000j, *State of the Art Report on Past Performance of Steel Moment-Frame Buildings in Earthquakes*, prepared by the SAC Joint Venture for the Federal Emergency Management Agency, Report No. FEMA-355E, Washington, D.C.

SAC, 2000k, *State of the Art Report on Performance Prediction and Evaluation*, prepared by the SAC Joint Venture for the Federal Emergency Management Agency, Report No. FEMA-355F, Washington, D.C.

SAC/BD-96/01, *Selected Results from the SAC Phase 1 Beam-Column Connection Pre-Test Analyses*, submissions from B. Maison, K. Kasai, and R. Dexter; and A. Ingrassia and G. Deierlein.

SAC/BD-96/02, *Summary Report on SAC Phase 1 - Task 7 Experimental Studies*, by C. Roeder (a revised version of this document is published in Report No. SAC 96-01; the original is no longer available).

SAC/BD-96/03, *Selected Documents from the U.S.-Japan Workshop on Steel Fracture Issues*.

- SAC/BD-96/04, *Survey of Computer Programs for the Nonlinear Analysis of Steel Moment Frame Structures*.
- SAC/BD-97/01, *Through-Thickness Properties of Structural Steels*, by J. Barsom and S. Korvink.
- SAC/BD-97/02, *Protocol for Fabrication, Inspection, Testing, and Documentation of Beam-Column Connection Tests and Other Experimental Specimens*, by P. Clark, K. Frank, H. Krawinkler, and R. Shaw.
- SAC/BD-97/03, *Proposed Statistical and Reliability Framework for Comparing and Evaluating Predictive Models for Evaluation and Design*, by Y.-K. Wen.
- SAC/BD-97/04, *Development of Ground Motion Time Histories for Phase 2 of the FEMA/SAC Steel Project*, by P. Somerville, N. Smith, S. Punyamurthula, and J. Sun.
- SAC/BD-97/05, *Finite Element Fracture Mechanics Investigation of Welded Beam-Column Connections*, by W.-M. Chi, G. Deierlein, and A. Ingrassia.
- SAC/BD-98/01, *Strength and Ductility of FR Welded-Bolted Connections*, by S. El-Tawil, T. Mikesell, E. Vidarsson, and S. K. Kunnath.
- SAC/BD-98/02, *Effects of Strain Hardening and Strain Aging on the K-Region of Structural Shapes*, by J. Barsom and S. Korvink
- SAC/BD-98/03, *Implementation Issues for Improved Seismic Design Criteria: Report on the Social, Economic, Policy and Political Issues Workshop* by L.T. Tobin.
- SAC/BD-99/01, *Parametric Study on the Effect of Ground Motion Intensity and Dynamic Characteristics on Seismic Demands in Steel Moment Resisting Frames* by G. A. MacRae
- SAC/BD-99/01A, *Appendix to: Parametric Study on the Effect of Ground Motion Intensity and Dynamic Characteristics on Seismic Demands in Steel Moment Resisting Frames* by G. A. MacRae
- SAC/BD-99/02, *Through-Thickness Strength and Ductility of Column Flange in Moment Connections* by R. Dexter and M. Melendrez.
- SAC/BD-99/03, *The Effects of Connection Fractures on Steel Moment Resisting Frame Seismic Demands and Safety* by C. A. Cornell and N. Luco
- SAC/BD-99/04, *Effects of Strength/Toughness Mismatch on Structural and Fracture Behaviors in Weldments* by P. Dong, T. Kilinski, J. Zhang and F.W. Brust
- SAC/BD-99/05, *Assessment of the Reliability of Available NDE Methods for Welded Joint and the Development of Improved UT Procedures* by G. Gruber and G. Light
- SAC/BD-99/06, *Prediction of Seismic Demands for SMRFs with Ductile Connections and Elements* by A. Gupta and H. Krawinkler
- SAC/BD-99/07, *Characterization of the Material Properties of Rolled Sections* by T. K. Jaquess and K. Frank
- SAC/BD-99/08, *Study of the Material Properties of the Web-Flange Intersection of Rolled Shapes* by K. R. Miller and K. Frank

- SAC/BD-99/09, *Investigation of Damage to WSMF Earthquakes other than Northridge* by M. Phipps
- SAC/BD-99/10, *Clarifying the Extent of Northridge Induced Weld Fracturing and Examining the Related Issue of UT Reliability* by T. Paret
- SAC/BD-99/11, *The Impact of Earthquakes on Welded steel Moment Frame Buildings: Experience in Past Earthquakes* by P. Weinburg and J. Goltz
- SAC/BD-99/12, *Assessment of the Benefits of Implementing the New Seismic Design Criteria and Inspection Procedures* by H. A. Seligson and R. Eguchi
- SAC/BD-99/13, *Earthquake Loss Estimation for WSMF Buildings*, by C. A. Kircher
- SAC/BD-99/14, *Simplified Loss Estimation for Pre-Northridge WSMF Buildings*, by B. F. Maison and D. Bonowitz
- SAC/BD-99/15, *Integrative Analytical Investigations on the Fracture Behavior of Welded Moment Resisting Connections*, by G. G. Deierlein and W.-M. Chi
- SAC/BD-99/16, *Seismic Performance of 3 and 9 Story Partially Restrained Moment Frame Buildings*, by B. F. Maison and K. Kasai
- SAC/BD-99/17, *Effects of Partially-Restrained Connection Stiffness and Strength on Frame Seismic Performance*, by K. Kasai, B. F. Maison, and A. Mayangarum
- SAC/BD-99/18, *Effects of Hysteretic Deterioration Characteristics on Seismic Response of Moment Resisting Steel Structures*, by F. Naeim, K. Skliros, A. M. Reinhorn and M.V. Sivaselvan
- SAC/BD-99/19, *Cyclic Instability of Steel Moment Connections with Reduced Beam Section*, by C.-M. Uang and C.-C. Fan
- SAC/BD-99/20, *Local and Lateral-Torsion Buckling of Wide Flange Beams*, by L. Kwasniewski, B. Stojadinovic, and S. C. Goel
- SAC/BD-99/21, *Elastic Models for Predicting Building Performance*, by X. Duan and J. C. Anderson
- SAC/BD-99/22, *Reliability-Based Seismic Performance Evaluation of Steel Frame Buildings Using Nonlinear Static Analysis Methods*, by G. C. Hart and M. J. Skokan
- SAC/BD-99/23, *Failure Analysis of Welded Beam to Column Connections*, by J. M. Barsom
- SAC/BD-99/24, *Weld Acceptance Criteria for Seismically-Loaded Welded Connections*, by W. Mohr
- SAC/BD-00/01, *Parametric Tests on Unreinforced Connections*, by K.-H. Lee, B. Stojadinovic, S. C. Goel, A. G. Margarian, J. Choi, A. Wongkaew, B. P. Reyher, and D.-Y. Lee
- SAC/BD-00/02, *Parametric Tests on the Free Flange Connections*, by J. Choi, B. Stojadinovic, and S. C. Goel
- SAC/BD-00/03, *Cyclic Tests on Simple Connections Including Effects of the Slab*, by J. Liu and A. Astaneh-Asl

- SAC/BD-00/04, *Tests on Bolted Connections*, by J. Swanson, R. Leon and J. Smallridge
- SAC/BD-00/05, *Bolted Flange Plate Connections*, by S. P. Schneider and I. Teeraparbong
- SAC/BD-00/06, *Round Robin Testing of Ultrasonic Testing Technicians*, by R. E. Shaw, Jr.
- SAC/BD-00/07, *Dynamic Tension Tests of Simulated Welded Beam Flange Connections*, by J. M. Ricles, C. Mao, E. J. Kaufmann, L.-W. Lu, and J. W. Fisher
- SAC/BD-00/08, *Design of Steel Moment Frame Model Buildings in Los Angeles, Seattle and Boston*, by P. Clark
- SAC/BD-00/09, *Benchmarking of Analysis Programs for SMRF System Performance Studies*, by A. G. and H. Krawinkler
- SAC/BD-00/10, *Loading Histories for Seismic Performance Testing of SMRF Components and Assemblies*, by H. Krawinkler, A. Gupta, R. Medina and N. Luco
- SAC/BD-00/11, *Development of Improved Post-Earthquake Inspection Procedures for Steel Moment Frame Buildings*, by P. Clark
- SAC/BD-00/12, *Evaluation of the Effect of Welding Procedure on the Mechanical Properties of FCAW-S and SMAW Weld Metal Used in the Construction of Seismic Moment Frames*, by M. Q. Johnson
- SAC/BD-00/13, *Preliminary Evaluation of Heat Affected Zone Toughness in Structural Shapes Used in the Construction of Seismic Moment Frames*, by M. Q. Johnson
- SAC/BD-00/14, *Evaluation of Mechanical Properties in Full-Scale Connections and Recommended Minimum Weld Toughness for Moment Resisting Frames*, by M. Q. Johnson, W. Mohr, and J. Barsom
- SAC/BD-00/15, *Simplified Design Models for Predicting the Seismic Performance of Steel Moment Frame Connections*, by C. Roeder, R.G. Coons, and M. Hoit
- SAC/BD-00/16, *SAC Phase 2 Test Plan*, by C. Roeder
- SAC/BD-00/17, *Behavior and Design of Radius-Cut, Reduced Beam Section Connections*, by M. Engelhardt, G. Fry, S. Johns, M. Venti, and S. Holliday
- SAC/BD-00/18, *Test of a Free Flange Connection with a Composite Floor Slab*, by M. Venti and M. Engelhardt
- SAC/BD-00/19, *Cyclic Testing of a Free Flange Moment Connection* by C. Gilton, B. Chi, and C. M. Uang
- SAC/BD-00/20, *Improvement of Welded Connections Using Fracture Tough Overlays*, by James Anderson, J. Duan, P. Maranian, and Y. Xiao
- SAC/BD-00/21, *Cyclic Testing of Bolted Moment End-Plate Connections*, by T. Murray and E. Sumner
- SAC/BD-00/22, *Cyclic Response of RBS Moment Connections: Loading Sequence and Lateral Bracing Effects*, by Q.S. Yu, C. Gilton, and C. M. Uang

- SAC/BD-00/23, *Cyclic Response of RBS Moment Connections: Weak Axis Configuration and Deep Column Effects*, by C. Gilton, B. Chi, and C. M. Uang
- SAC/BD-00/24, *Development and Evaluation of Improved Details for Ductile Welded Unreinforced Flange Connections*, by J.M. Ricles, C. Mao, L.W. Lu, and J. Fisher
- SAC/BD-00/25, *Performance Prediction and Evaluation of Steel Special Moment Frames for Seismic Loads*, by K. Lee and D. A. Foutch
- SAC/BD-00/26, *Performance Prediction and Evaluation of Low Ductility Steel Moment Frames for Seismic Loads*, by S. Yun and D. A. Foutch
- SAC/BD-00/27, *Steel Moment Resisting Connections Reinforced with Cover and Flange Plates*, by T. Kim, A.S. Whittaker, V.V. Bertero, and A.S.J. Gilani
- SAC/BD-00/28, *Failure of a Column K-Area Fracture*, by J.M. Barsom and J.V. Pellegrino
- SAC/BD-00/29, *Inspection Technology Workshop*, by R. E. Shaw, Jr.

Acronyms.

A, acceleration response	CUREe, California Universities for Research in Earthquake Engineering
ACAG, air carbon arc gouging	CVN, Charpy V-notch
ACIL, American Council of Independent Laboratories	CWI, Certified Welding Inspector
AISC, American Institute for Steel Construction	D, displacement response
ANSI, American National Standards Institute	DST, Double Split Tee (connection)
API, American Petroleum Institute	DTI, Direct Tension Indicator
ASNT, American Society for Nondestructive Testing	EGW, electrogas welding
ASTM, American Society for Testing and Materials	ELF, equivalent lateral force
ATC, Applied Technology Council	ESW, electroslog welding
A2LA, American Association for Laboratory Accreditation	FCAW-S, flux-cored arc welding – self-shielded
AWS, American Welding Society	FCAW-G, flux-cored arc welding – gas-shielded
BB, Bolted Bracket (connection)	FEMA, Federal Emergency Management Agency
BFP, Bolted Flange Plates (connection)	FF, Free Flange (connection)
BOCA, Building Officials and Code Administrators	FR, fully restrained (connection)
BSEP, Bolted Stiffened End Plate (connection)	GMAW, gas metal arc welding
BUEP, Bolted Unstiffened End Plate (connection)	GTAW, gas tungsten arc welding
CAC-A, air carbon arc cutting	HAZ, heat-affected zone
CAWI, Certified Associate Welding Inspector	IBC, <i>International Building Code</i>
CJP, complete joint penetration (weld)	ICBO, International Conference of Building Officials
CP, Collapse Prevention (performance level)	ICC, International Code Council
	IMF, Intermediate Moment Frame
	IO, Immediate Occupancy (performance level)

ISO, International Standardization Organization	RT, radiographic testing
IWURF, Improved Welded Unreinforced Flange (connection)	SAC, the SAC Joint Venture; a partnership of the Structural Engineers Association of California, the Applied Technology Council, and California Universities for Research in Earthquake Engineering
L, longitudinal	SAW, submerged arc welding
LDP, Linear Dynamic Procedure	SBC, <i>Standard Building Code</i>
LRFD, load and resistance-factor design	SBCCI, Southern Building Code Congress International
LS, Life Safety (performance level)	SCWI, Senior Certified Welding Inspector
LSP, Linear Static Procedure	SEAOC, Structural Engineers Association of California
MCE, Maximum Considered Earthquake	SFRS, seismic-force-resisting system
MMI, Modified Mercalli Intensity	SMAW, shielded metal arc welding
MRS, modal response spectrum	SMF, Special Moment Frame
MRSF, steel moment frame	SP, Side Plate (connection)
MT, magnetic particle testing	SUG, Seismic Use Group
NBC, <i>National Building Code</i>	SW, Slotted Web (connection)
NDE, nondestructive examination	T, transverse
NDP, Nonlinear Dynamic Procedure	TIGW, tungsten inert gas welding
NDT, nondestructive testing	UBC, <i>Uniform Building Code</i>
NEHRP, National Earthquake Hazard Reduction Program	UT, ultrasonic testing
NES, National Evaluation Services	VI, visual inspection
NSP, Nonlinear Static Procedure	WBH, Welded Bottom Haunch (connection)
NVLAP, National Volunteer Laboratory Accreditation Program	WCPF, Welded Cover Plate Flange (connection)
OMF, Ordinary Moment Frame	WFP, Welded Flange Plate (connection)
PGA, peak ground acceleration	WPQR, Welding Performance Qualification Record
PJP, partial joint penetration (weld)	WPS, Welding Procedure Specification
PIDR, pseudo interstory drift ratio	WSMF, welded steel moment frame
PQR, Performance Qualification Record	WT, Welded Top Haunch (connection)
PR, partially restrained (connection)	WTBH, Welded Top and Bottom Haunch (connection)
PT, liquid dye penetrant testing	WUF-B, Welded Unreinforced Flanges – Bolted Web (connection)
PWHT, postweld heat treatment	WUF-W, Welded Unreinforced Flanges – Welded Web (connection)
PZ, panel zone	
QA, quality assurance	
QC, quality control	
QCP, Quality Control Plan, Quality Certification Program	
RBS, Reduced Beam Section (connection)	
RCSC, Research Council for Structural Connections	