



## List of SAC Background Documents (Disk 1)

<b>Click Here for</b>	<i>Information About the FEMA-Funded SAC Steel Project and the SAC Background Documents</i>
<b>SAC/BD-96/01,</b>	<i>Selected Results from the SAC Phase I Beam-Column Connection Pre-Test Analyses</i>
<b>SAC/BD-96/03,</b>	<i>Selected Documents from the U.S.-Japan Workshop on Steel Fracture Issues</i>
<b>SAC/BD-96/04,</b>	<i>Survey of Computer Programs for the Analysis of Steel Moment Frame Structures</i>
<b>SAC/BD-97/01,</b>	<i>Through-Thickness Properties of Structural Steels</i>
<b>SAC/BD-97/02,</b>	<i>Protocol for Fabrication, Inspection, Testing and Documentation of Beam-Column Connection Tests and Other Experimental Specimens</i>
<b>SAC/BD-97/03,</b>	<i>Proposed Statistical and Reliability Framework for Comparing and Evaluating Predictive Models for Evaluation and Design, and Critical Issues in Developing Such Framework</i>
<b>SAC/BD-97/04,</b>	<i>Development of Ground Motion Time Histories for Phase 2 of the FEMA/SAC Steel Project</i>
<b>SAC/BD-97/05,</b>	<i>Finite Element Fracture Mechanics Investigation of Welded Beam-Column Connections</i>
<b>SAC/BD-98/01,</b>	<i>Strength and Ductility of FR Welded-Bolted Connections</i>
<b>SAC/BD-98/02,</b>	<i>Effects of Strain Hardening and Strain Aging on the K-Region of Structural Shapes</i>
<b>SAC/BD-98/03,</b>	<i>Implementation Issues for Improved Seismic Design Criteria: Report on the Social, Economic, Policy and Political Issues Workshop</i>
<b>SAC/BD-99/01,</b>	<i>Parametric Study on the Effect of Ground Motion Intensity and Dynamic Characteristics on Seismic Demands in Steel Moment Resisting Frames</i>
<b>SAC/BD-99/01A,</b>	<i>Appendix to: Parametric Study on the Effect of Ground Motion Intensity and Dynamic Characteristics on Seismic Demands in Steel Moment Resisting Frames</i>
<b>SAC/BD-99/02,</b>	<i>Through-Thickness Strength and Ductility of Column Flanges in Moment Connections</i>
<b>SAC/BD-99/03,</b>	<i>The Effects of Connection Fractures on Steel Moment Resisting Frame Seismic Demands and Safety</i>
<b>SAC/BD-99/04,</b>	<i>Effects of Strength/Toughness Mismatch on Structural and Fracture Behaviors in Weldments</i>
<b>SAC/BD-99/05,</b>	<i>Assessment of the Reliability of Available NDE Methods for Welded Joints and the Development of UT Procedures</i>
<b>SAC/BD-99/06,</b>	<i>Prediction of Seismic Demands for SMRFs with Ductile Connections and Elements</i>
<b>SAC/BD-99/07,</b>	<i>Characterization of the Material Properties of Rolled Sections</i>

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## **About the FEMA-Funded SAC Steel Project and the SAC Background Documents**

### **SAC Steel Project**

The SAC Steel Project commenced in 1994 after the discovery of brittle fractures in numerous beam-to-column welded connections in steel-frame buildings in the Los Angeles area, resulting from the January 17, 1994 Northridge, California, earthquake.

Under Phase I of the SAC Steel Project, which was funded by the Federal Emergency Management Agency (FEMA) and the California Governor's Office of Emergency Services, the SAC Joint Venture (see below) conducted an Invitational Workshop on Steel Seismic Issues, performed problem-focused studies of the seismic performance of steel moment-frame buildings, and developed recommendations for professional practice. Phase I was completed in late 1995 with the publication of a series of Technical Reports and a series of advisories and interim guidelines for the evaluation, repair, modification and design of these steel moment-frame buildings. These advisories and interim guidelines were superseded by the reports published under Phase II.

Phase II, an extensive 5-year FEMA-funded problem-focused study of the performance of moment resisting steel frames and connections of various configurations, commenced in September 1995. The work included extensive analyses of buildings, detailed finite element and fracture mechanics investigations of various connections, and more than 120 full-scale tests of connection assemblies. Phase II culminated in the year 2000 with the publication of four Seismic Design Recommended Criteria, six State-of-the-Art Reports, and 66 Background Documents.

All SAC Steel Project Phase I and Phase II reports are now available through the Applied Technology Council.

### **SAC Joint Venture**

SAC is a joint venture of the Structural Engineers Association of California (SEAOC), the Applied Technology Council (ATC), and California Universities for Research in Earthquake Engineering (CUREe), formed specifically to address both immediate and long-term needs related to solving performance problems with welded, steel moment-frame connections discovered following the 1994 Northridge earthquake. Phase I and Phase II of the SAC Joint Steel Project were carried out under the direction of the SAC Joint Venture Management Committee and the SAC Project Management Committee. The research and development team included consultants and subcontractor universities and organizations from across the nation, uniquely qualified to solve problems related to the seismic performance of steel moment-frame structures.

### **SAC Background Documents**

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## List of SAC Background Documents (Disk 2)

<b>Click Here for</b>	<i>Information About the FEMA-Funded SAC Steel Project and the SAC Background Documents</i>
<b>SAC/BD-99/08,</b>	<i>Study of the Material Properties of the Web-Flange Intersection of Rolled Shapes</i>
<b>SAC/BD-99/09,</b>	<i>Investigation of Damage to WSMF by Earthquakes Other Than Northridge</i>
<b>SAC/BD-99/10,</b>	<i>Clarifying the Extent of Northridge-Induced Weld Fracturing; Examining the Related Issue of UT Reliability</i>
<b>SAC/BD-99/11,</b>	<i>The Impact of Earthquakes on Welded Steel Moment Frame Buildings: Experience in Past Earthquakes</i>
<b>SAC/BD-99/12,</b>	<i>Assessment of the Benefits of Implementing the New Seismic Design Criteria and Inspection Procedures</i>
<b>SAC/BD-99/13,</b>	<i>Earthquake Loss Estimation Methods for WSMF Buildings</i>
<b>SAC/BD-99/14,</b>	<i>Simplified Loss Estimation for Pre-Northridge WSMF Buildings</i>
<b>SAC/BD-99/15,</b>	<i>Integrative Analytical Investigations on the Fracture Behavior of Welded Moment Resisting Connections</i>
<b>SAC/BD-99/16,</b>	<i>Seismic Performance of 3 and 9 Story Partially Restrained Moment Frame Buildings</i>
<b>SAC/BD-99/17,</b>	<i>Effects of Partially Restrained Connection Stiffness and Strength on Frame Seismic Performance</i>
<b>SAC/BD-99/18,</b>	<i>Effects of Hysteretic Deterioration Characteristics on Seismic Response of Moment Resisting Steel Structures</i>
<b>SAC/BD-99/19,</b>	<i>Cyclic Instability of Steel Moment Connections with Reduced Beam Sections</i>
<b>SAC/BD-99/20,</b>	<i>Local and Lateral-Torsional Buckling of Wide-Flange Beams</i>
<b>SAC/BD-99/21,</b>	<i>Elastic Models for Predicting Building Performance</i>
<b>SAC/BD-99/22,</b>	<i>Reliability-Based Seismic Performance Evaluation of Steel Frame Buildings Using Nonlinear Static Analysis Methods</i>
<b>SAC/BD-99/23,</b>	<i>Failure Analysis of Welded Steel Moment-Resisting Frame Connections Parts I and II</i>
<b>SAC/BD-99/24,</b>	<i>Weld Acceptance Criteria for Seismically-Loaded Welded Connections</i>
<b>SAC/BD-00/01,</b>	<i>Parametric Tests on Unreinforced Connections Volume I Final Report</i>
<b>SAC/BD-00/01A,</b>	<i>Parametric Tests on Unreinforced Connections Volume II Appendices</i>
<b>SAC/BD-00/02,</b>	<i>Parametric Tests on the Free Flange Connections</i>
<b>SAC/BD-00/03,</b>	<i>Cyclic Tests on Simple Connections, Including Effects of the Slab</i>
<b>SAC/BD-00/04,</b>	<i>Tests on Bolted Connections Part I: Technical Report</i>
<b>SAC/BD-00/04A,</b>	<i>Tests on Bolted Connections Part II: Appendices</i>

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## List of SAC Background Documents (Disk 3)

<b>Click Here for</b>	<i>Information About the FEMA-Funded SAC Steel Project and the SAC Background Documents</i>
<b>SAC/BD-00/05,</b>	<i>Bolted Flange Plate Connections</i>
<b>SAC/BD-00/06,</b>	<i>Round-Robin Testing of Ultrasonic Testing Technicians</i>
<b>SAC/BD-00/07,</b>	<i>Dynamic Tension Tests of Simulated Welded Beam Flange Connections</i>
<b>SAC/BD-00/09,</b>	<i>Benchmarking of Analysis Programs for SMRF System Performance Studies</i>
<b>SAC/BD-00/10,</b>	<i>Loading Histories for Seismic Performance Testing of SMRF Components and Assemblies</i>
<b>SAC/BD-00/12,</b>	<i>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</i>
<b>SAC/BD-00/13,</b>	<i>Preliminary Evaluation of Heat Affected Zone Toughness in Structural Shapes Used in the Construction of Seismic Moment Frames</i>
<b>SAC/BD-00/14,</b>	<i>Evaluation of Mechanical Properties in Full-Scale Connections and Recommended Minimum Weld Toughness for Moment Resisting Frames</i>
<b>SAC/BD-00/15,</b>	<i>Simplified Design Models for Predicting the Seismic Performance of Steel Moment Frame Connections</i>
<b>SAC/BD-00/16,</b>	<i>SAC Phase 2 Test Plan</i>
<b>SAC/BD-00/17,</b>	<i>Behavior and Design of Radius Cut Reduced Beam Section Connections</i>
<b>SAC/BD-00/18,</b>	<i>Test of a Free Flange Connection with a Composite Floor Slab</i>
<b>SAC/BD-00/19,</b>	<i>Cyclic Testing of a Free Flange Moment Connection</i>
<b>SAC/BD-00/20,</b>	<i>Improvement of Welded Connections Using Fracture Tough Overlays</i>
<b>SAC/BD-00/21,</b>	<i>Cyclic Testing of Bolted Moment End-Plate Connections</i>
<b>SAC/BD-00/22,</b>	<i>Cyclic Response of RBS Moment Connections: Loading Sequence and Lateral Bracing Effects</i>
<b>SAC/BD-00/23,</b>	<i>Cyclic Response of RBS Moment Connections: Weak-Axis Configuration and Deep Column Effects</i>
<b>SAC/BD-00/24,</b>	<i>Development and Evaluation of Improved Details for Ductile Welded Unreinforced Flange Connections</i>
<b>SAC/BD-00/25,</b>	<i>Performance Prediction and Evaluation of Steel Special Moment Frames for Seismic Loads</i>
<b>SAC/BD-00/26,</b>	<i>Performance Prediction and Evaluation of Low Ductility Steel Moment Frames for Seismic Loads</i>
<b>SAC/BD-00/27,</b>	<i>Cover-Plate and Flange-Plate Reinforced Steel Moment-Resisting Connections</i>
<b>SAC/BD-00/28,</b>	<i>Failure of a Column K-Area Fracture</i>
<b>SAC/BD-00/29,</b>	<i>Inspection Technology Workshop</i>
<b>SAC/BD-00/30,</b>	<i>Preliminary Assessment of the Impact of the Northridge Earthquake on Construction Costs of Steel Moment Frame Buildings</i>

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