

## ENGINEERING SOFTWARE

Company	Products Offered	Product Descriptions
<b>Acronym Software, Inc.</b> <a href="http://www.acronym.ca">www.acronym.ca</a> 519.885.2454	SODA 4: Structural Optimization Design & Analysis	Software for the analysis and design of steel frameworks. Analyzes and designs steel frameworks subject to AISC and CISC standards. The latest release has new toolbars, a faster analysis engine, enhanced output viewer, and an editor for steel cross-sections.
<b>ALGOR, Inc.</b> <a href="http://www.algor.com">www.algor.com</a> 412.967.2700	ALGOR Software	Includes design, analysis, and simulation tools that allow engineers to virtually test and predict real-world behavior of new and existing product designs. Software simulation capabilities include static stress and mechanical event simulation with linear and nonlinear material models, linear dynamics, steady-state and transient heat transfer, steady and unsteady fluid flow, electrostatics, full multiphysics, and piping. Analysis capabilities are all available within FEMPRO, a user interface that supports most CAD solid modelers.
<b>AnyDWG Software, Inc.</b> <a href="http://www.anydwg.com">www.anydwg.com</a> 86.138.1337.3325	Any DWG to DXF Converter	A batch DWG and DXF bi-directional converter that allows you to convert DWG to DXF, and DXF to DWG without the need of AutoCAD.
	Any DWG to PDF Converter	A batch converter that allows you to convert DWG and DXF files to PDF without the need of AutoCAD.
	Any DWG to Image Converter	Batch convert DWG and DXF files to TIF/TIFF, JPG/JPEG, BMP, GIF, PNG, TGA, PCX, WMF, and EMF without the need of AutoCAD.
	Any DWG to DWF Converter	Batch convert DWG and DXF files to DWF without the need of AutoCAD.
<b>ATIR Engineering Software</b> <a href="http://www.ATIR.com">www.ATIR.com</a> 847.677.1945	STRAP Version 11.5	A 3D static and dynamic, frame and finite element analysis and design system. Pre- and post-analysis options quicken and simplify data input and results interpretation. Post-processors include steel, concrete, and light gauge steel design.
	STRAP BRIDGE	Intended for bridge engineers who design bridge structures of all shapes for moving loads. This program creates 3D influence lines for any point and calculates the critical effect of vehicle loads.
<b>Bentley Systems, Inc.</b> <a href="http://www.bentley.com">www.bentley.com</a> 800.BENTLEY	Bentley Structural	An intuitive user interface, powerful tools, and standard components support structural engineers and designers with the design, documentation, and analysis of structural systems, including steel, concrete, and timber. Based on MicroStation, Bentley's flagship product for the design, construction, and operation of infrastructure.
	STAAD.Pro 2005	Integrated engineering software for 3D structural model generation, robust analysis, and multi-material design. Features include a user-friendly GUI, visualization tools, and analysis and design facilities, with seamless integration to other software.
	RAM Structural System*	Fully integrated suite of structural engineering modeling software that offers complete building analysis, design, and drafting software for steel and concrete structures, including a versatile modeler and graphical model and structural database.
	Bentley ProjectWise	An integrated suite of collaboration servers that provides managed access to AEC content within the workgroup, across a distributed organization, or among collaborating organizations throughout the world.
<b>Bestech Systems LLC</b> <a href="http://www.LRFDsoftware.com">www.LRFDsoftware.com</a> 212.295.2192	SAM	Design software for bridges. Unique because it integrates analysis with code checking, which means significant productivity increases for bridge design engineers.
<b>Cascade Consulting Associates</b> <a href="http://www.strucalc.com">www.strucalc.com</a> 800.279.1353	StruCalc	Designs beams, columns, joists, rafters, and footings using steel, tube steel, solid sawn lumber, glulams, flitch beams, I-joists, and structural composite lumber from five manufacturers. Includes ten modules.
<b>Computations &amp; Graphics, Inc.</b> <a href="http://www.cg-inc.com">www.cg-inc.com</a> 303.668.1091	REAL3D-Analysis	A user-friendly and powerful structural analysis and design program. Features extremely accurate 128-bit floating point solver, multiple-document interface, spreadsheet input/output and OpenGL® graphics.
	RcSections	An RC beam/column section design tool. It analyzes regular and irregular section capacity. Presents 2D interaction diagrams and incredible 3D interaction surface.
<b>Computers &amp; Structures, Inc.</b> <a href="http://www.csiberkeley.com">www.csiberkeley.com</a> 510.845.2177	SAP2000	Features a very sophisticated, intuitive, and versatile user interface powered by an unmatched analysis engine and design tools for engineers working on transportation, industrial, public works, sports, and other facilities.
	ETABS	Building analysis and design software that can help design a simple 2D frame or perform a dynamic analysis of a complex high-rise that utilizes non-linear dampers for inter-story drift control.
<b>Creative Engineering</b> <a href="http://www.beltconveyor.com">www.beltconveyor.com</a> 661.872.4763	WinBuild	Computes beams and columns. Automatic shape selection plus "RSMeans®" data displays meaningful RDI. After quick modeling to maximize profitability, export output data via AutoCAD VBA to expedite finalization. Free demo.
<b>CSC UK Ltd.</b> <a href="http://www.cscworld.com">www.cscworld.com</a> 44.113.239.3000	Fastrak Building Designer	Highly productive building design software that has had an impact on the increasingly popular design-build market in the UK.
<b>Daystar Software, Inc.</b> <a href="http://www.daystarsoftware.com">www.daystarsoftware.com</a> 816.741.4310	Multiframe	A fully graphical structural engineering design and analysis software for 2D and 3D modeling. Featuring fast interactive graphics, Multiframe provides exceptional ease of use combined with powerful static or dynamic analysis capabilities.

\*Bentley Systems, Inc. acquired RAM International, LLC on December 9, 2005.

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<b>Design Data</b> <a href="http://www.sds2.com">www.sds2.com</a> 800.443.0782	SDS/2	A 3D computer modeling software product designed for the structural steel industry. The user creates a 3D model of a structure that is used to automatically design members and member end connections, produce shop drawings, order material, create CNC files for automated fabrication, and share data with other software products. Allows steel detailers, fabricators, engineers, and erectors to access the same 3D model from anywhere in the world simultaneously.
<b>Devco Software, Inc.</b> <a href="http://www.devcosoftware.com">www.devcosoftware.com</a> 541.426.5713	LGBEAMER v6 Pro	Designs cold-formed members with uniform, concentrated, sloping, and axial loads using single, boxed, back-to-back, and built-up members. Includes the 2001 NASPEC.
<b>Digital Canal</b> <a href="http://www.digitalcanal.com">www.digitalcanal.com</a> 800.449.5033	VersaFrame	A simple, full-featured general 3D analysis/design program. The program was written to provide concise, straightforward solutions for the vast majority of projects encountered by the "average" engineer.
	Frame Analysis	The only 3D frame analysis/design program fully integrated into AutoCAD. Key features include integrated steel design, spread footing design, non-linear elements, advanced non-linear analyses, and much more.
	Steel Design	Detailed, accurate, and easy-to-use steel member design software. Calculation procedure reports have been mimicked by many, matched by none.
	Wind Analysis	Has been making ASCE wind load calculations easy for nearly 15 years. Wind Analysis does not gloss the code over—it provides a thorough determination of the code specified pressures.
<b>Dlupal Engineering Software GmbH</b> <a href="http://www.dlupal.com">www.dlupal.com</a> 49.096.739.2030	RFEM 3D—Finite Elements for Plates, Shells, Solids, and Frameworks	RFEM analyzes deformations, internal forces, and stresses according to the FE method. The application range covers complex steel frames, detailed-modelled connections, plant constructions, or glass frameworks. Does not require extensive training sessions. Structures can be comfortably modelled with the help of typical CAD operations and spreadsheet or parameter-controlled input. Spreadsheets and graphics are simultaneously updated. Creates automatic intersections of several surfaces of any shape. Possible to quickly model combined structures of shells, beams and solids and analyze them according 1st, 2nd (P-Delta) or 3rd (cables and large deformations) order. Includes comprehensive and extendable libraries of materials and cross-sections. Stability and dynamic analyses complete the design capabilities of RFEM.
<b>ENERCALC, Inc.</b> <a href="http://www.enercalc.com">www.enercalc.com</a> 800.424.2252	Structural Engineering Library	A single program that integrates 45 calculation modules into a single comprehensive engineer's desktop tool. A fill-in-the-blanks "calcpad"-style form and well-designed calculation screens make input and results review among the fastest in the industry.
<b>Engineering Advice, Inc.</b> <a href="http://www.engineeringadvice.com">www.engineeringadvice.com</a> 561.241.3039	LRFD Structural Design	A tool for analysis and design of gravity load-resisting members in steel buildings based on the 2001 LRFD <i>Manual of Steel Construction</i> . Design features include tension and compression members, beams, and beam-columns. The bolted and welded connections module is comprehensive.
<b>Engineous Software</b> <a href="http://www.engineous.com">www.engineous.com</a> 919.677.6700	iSIGHT	Manages the computer software required to execute simulation-based design processes, including commercial CAD/CAE software, internally developed programs, and Microsoft Excel spreadsheets. iSIGHT enables the rapid integration of these programs and automates their execution.
	FIPER	Establishes a web-based, distributed engineering process infrastructure that allows organizations to access, execute, and reuse design tools and processes.
<b>Georgia Tech—CASE Center</b> <a href="http://www.gtstrudl.gatech.edu">www.gtstrudl.gatech.edu</a> 404.894.2260	GT STRUDL®	Structural design and analysis software for comprehensive frame and finite element modeling, finite element analysis, steel design, and reinforced concrete design with graphical display of analysis and design results.
<b>Integrated Engineering Software, Inc.</b> <a href="http://www.iesweb.com">www.iesweb.com</a> 800.707.0816	VisualAnalysis and AnalysisGroup	For over a decade, Integrated Engineering Software, Inc. (IES) continues to provide leading-edge structural engineering software. Over 1,800 professional engineering firms and 200 universities rely on IES's intuitive user interface, software productivity in minutes, informative reports, accessible technical support, and commitment to evolve its broad product line. Producing fully guaranteed products like VisualAnalysis for general analysis and building design, IES sets a standard for results-oriented engineers.
<b>Integrated Structural Software, Inc.</b> <a href="http://www.robot-structures.com">www.robot-structures.com</a> 888.477.8491	ROBOT Millennium	Structural analysis and design software. Its facilities are within a single interface and include frames, plates, shells, cables, dynamics, P-Delta, and plasticity.
	RCAD	Detailing software based on AutoCAD with integrated links to and from ROBOT Millennium for analysis and design. Includes RCAD Steel for 3D modeling of steel structures.
	ESOP	An everyday calculation tool on a Microsoft Excel platform. It has over 100 engineering modules, including integration with ROBOT Millennium software and user ability to define analysis and design modules.
<b>Intergraph Process, Power &amp; Offshore</b> <a href="http://ppo.intergraph.com/structural">ppo.intergraph.com/structural</a> 800.260.0246	FrameWorks Plus 7.2	Produces intelligent models and fabrication and detailing data packages. Use 3D model data for physical members, material takeoffs, and project reviews. Supports 3D modeling and drawing, fabrication and detailing of steel beams, columns, braces, cutouts, sleeves, concrete slabs and walls, and offshore marine structures.

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<b>King &amp; Associates LLC</b> <a href="http://www.spacegass.com">www.spacegass.com</a> 888.844.9608	SPACE GASS 10—Structural Analysis/Design	For small beams, trusses and portal frames to large high rise buildings, towers, cranes, and bridges. Features include moving loads, cable modeling, etc.
<b>LUSAS</b> <a href="http://www.lusas.com">www.lusas.com</a> 800.97.LUSAS	LUSAS Bridge	Bridge engineering analysis software with Autoloader vehicle loading and facilities for fundamental frequency, seismic, dynamic, large deflection, and fatigue analysis. For all types of bridge analysis, from simple footbridges, integral abutment, and curved steel girder bridges to complex cable stayed and suspension structures.
	LUSAS Civil & Structural	Structural engineering analysis software with comprehensive facilities for all types of analysis including linear, non-linear, seismic, blast, buckling, impact, and fire. For use on a full range of structures including buildings, towers, space-frame roofs, grandstands, and stadia.
<b>MDX Software</b> <a href="http://www.mdxsoftware.com">www.mdxsoftware.com</a> 573.446.3221	MDX Software Curved and Straight Steel Bridge Design and Rating	For designing and evaluating curved and straight steel girder bridges for compliance with AASHTO ASD, LFD, and LRFD specifications. The user interface recently has been redesigned to significantly streamline input procedures and the reviewing of analysis results. A free 15-day trial version is available.
<b>MIDASoft Inc.</b> <a href="http://www.MidasUser.com">www.MidasUser.com</a> 800.584.5541	MIDAS/Civil (Bridge)	3-D bridge analysis and design for post-tensioned (cantilever, incremental, staged supports), cable stayed, suspension, composite girder, slab, culvert, and frame types of all section shapes reflecting time-dependent construction stages.
	MIDAS/Gen (Building)	General purpose FE program with building structure features including construction stages, column shortening, staged post-tensioning, auto lateral load and building generation, cable and nonlinear analyses, and design of RC and steel.
	MIDAS/SDS (Slab and Mat)	Suspended slab and foundation mat auto design based on automatic finite element generation. Other features include generation of elastic foundation, pile placement, reinforcing design, etc. SDS operates in conjunction with Gen.
	MIDAS/Set (Component Design Modules)	Steel and RC component design: beams, regular and irregular columns, linear and general I-shape shear walls, combined footings, retaining walls, composite beams, plate girders, crane girders, web openings, etc.
<b>NYacad, Inc.</b> <a href="http://www.nyacad.com">www.nyacad.com</a> 646.369.9006	Solid Structural	3D steel AutoDetailing, AutoCAD-based software. Engineering layouts include steel framing and foundation plans, and sections and drawings of piece details in auto regime with auto updated reports.
	Quick Structural	Features auto generated steel framing and foundation plans, elevations, typical sections, and grids (AutoCAD). Includes a structural shapes database with a powerful calculator for search, selection, and calculation functions.
	AcadCalcStair	A free program for engineering calculations within AutoCAD and drafting tools. Mathematical operations, in any format of numbers, include slopes and triangles calculations. Stairs include parametric modeling, calculations, and auto drafting.
<b>Omnitech Associates, Inc.</b> <a href="http://www.desconplus.com">www.desconplus.com</a> 888.8.DESCON	DesconWin Software	Updated for AISC 2005 specification. Designs beam shear and moment connections to girders and columns, beam and column splices, and FEMA-350 connections. Available in U.S. and metric units, as well as ASD and LRFD.
	Descon Brace Software	Updated for AISC 2005 specification. Designs connections of diagonal, chevron, K, and knee braces, including brace connections to column base. Available in U.S. and metric units, as well as ASD and LRFD.
<b>Opti-Mate, Inc.</b> <a href="http://www.opti-mate.com">www.opti-mate.com</a> 610.530.9031	Merlin Dash, Descus I, SABRE	Software for analysis, design, rating and construction staging of straight or horizontally curved bridges and highway sign structures and luminaires with AASHTO ASD, LFD, or LRFD code check. Software packages include Merlin Dash for steel I-girders, Descus I for curved I-girder bridges, Descus II for horizontally curved box girder bridges, and SABRE for sign structures and luminaires.
<b>Prokon USA</b> <a href="http://www.prokon.com">www.prokon.com</a> 620.640.1029	Prokon Suite of Structural Analysis and Design Software	Frame and finite element analysis. Frame gives freedom to design in 2D and 3D. Includes linear, second order, non-linear, modal, harmonic, and earthquake analysis. Steel member and connection design. The steel member design modules can be used for elastic and plastic design of structural steel members. The steel connection design modules can be used for design of common welded and bolted steel connections.
<b>RAM International*</b> <a href="http://www.ramint.com">www.ramint.com</a> 800.726.7789 Outside U.S. 1.760.431.3610	RAM Structural System	A fully integrated engineering analysis, design, and drafting system for building structures. Integration with CAD and BIM systems for collaboration between engineers, drafters, and other team members.
	RAM Advanse	Full featured finite element analysis and design. New Version 7.0 represents introduction of the Engineering Desktop System, complete with utilities for isolated design and investigation, including retaining wall and continuous beam modules.
	RAM CADstudio	Streamlines one of the most time-consuming and error prone processes in the design office—generation, coordination, and review of construction drawings. Provides a continuous electronic flow of information between the engineers and CAD department.
	RAM Connection	Steel connection design and analysis of shear, moment and gusset plate connections. Design or check single connections. Fully integrated with RAM Structural System and RAM Advanse models.

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<b>Research Engineers International</b> <a href="http://www.reiworld.com">www.reiworld.com</a> 800.367.7373	STAAD.Pro 2005	Features a state-of-the-art user interface, visualization tools, and powerful analysis and design engines with advanced finite element and dynamic analysis capabilities. STAAD.Pro is the professional's choice for steel, concrete, timber, aluminum, and cold-formed steel design.
	STAAD.foundation	STAAD.foundation can automatically absorb the geometry, loads, and results from a STAAD.Pro model and accurately design isolated or combined footing or true mat foundations, and can even perform pile cap arrangements.
	STAAD.etc	Everything from the analysis and design of a structure to the design of slabs, base plates, or footings for its foundation can be done without having to leave the STAAD.etc environment.
	STAAD.beam	Design composite, non-composite, or partially composite steel beams in seconds. The beams can be cantilevered (overhangs), have multiple spans, or even have rectangular and circular stiffened or unstiffened web openings.
<b>RISA Technologies</b> <a href="http://www.risatech.com">www.risatech.com</a> 800.332.RISA	RISAFloor	Custom tailored for building design. Graphically lays out floors or imports/exports CAD plans. Integrates seamlessly with RISA-3D for gravity and lateral design in one model—steel, concrete, timber, or cold-formed.
	RISA-3D	For structural analysis and design of industrial and commercial buildings and many other civil structures. User-friendly interface meets a powerful analysis engine for static, dynamic, and RSA analyses. Design steel, concrete, timber, or cold-formed.
	Structural Desktop	Your drawing production solution. Create plans, elevations, and sections—or even rendered 3D models and details—from RISA-3D and RISAFloor models. SDT runs inside of AutoCAD (or ADT).
	RISATower (formerly ERITower)	Automated analysis/design of stepped and tapered monopoles, self-supporting lattice towers, and some of the world's tallest guyed towers. Exhaustive catalogs of antennas, dishes, and other appurtenances. All RS, EIA/TIA, and ASCE 7 codes including the recently adopted TIA-222G standard.
<b>SAFI Quality Software, Inc.</b> <a href="http://www.safi.com">www.safi.com</a> 800.810.9454	Steel Calculator™	Allows the user to verify, design, and optimize steel beams and columns. An efficient validation tool to verify design results of specific elements of complex models.
	SAFI™Steel Design	Allows the user to verify, design, and optimize the steel members of a structure and composite steel-concrete beams. The unique interface of SAFI 3D allows to create, analyze, and design complex models. Design optimization makes economic and quality steel structures a reality.
	Virtual Steel Buildings™	Its technology stores all design information and intents in a single coherent database and enhances the model with configurable views. It integrates the design processes of aspects such as estimation, engineering, detailing, and fabrication.
<b>SOFTEK Services Ltd.</b> <a href="http://www.csc-softtek.com">www.csc-softtek.com</a> 604.273.7737	S-FRAME®	4D/3D/2D modeling and analysis software. State-of-the-art graphical interface with folder technology and dynamic grids; staged construction analysis; MDB export/import; inclined diaphragms; and automated area loads, notional loads, and story drift.
	S-STEEL™	Fully S-FRAME-integrated structural steel design features. Auto-design and code checking for strength and serviceability. Automatic governing member identification for optimal design. Automated steel quantities. Supports multiple design codes.
	TEDDS®	Microsoft® Word-based electronic calculation pad and library of automated structural engineering calculations and tools including wind and seismic loading, continuous beam analysis, and a custom section editor.
<b>Stat-Ease, Inc.</b> <a href="http://www.statease.com">www.statease.com</a> 612.378.9449	Design-Ease®	Sets up and analyzes powerful general and two-level factorials that identify the critical factors for improvement of products and processes.
	Design-Expert®	Includes the same features as Design-Ease, plus 3D response surface optimization for process, mixture, and combined mixture/process variables.
<b>Structural Desktop, Inc.</b> <a href="http://www.structuraldesktop.com">www.structuraldesktop.com</a> 479.471.5227	Structural Desktop Version 2.0	Runs in AutoCAD. With this software, AutoCAD reads and writes STAAD, RISA, GT STRUDL, and SAP2000 files. Structural Desktop creates Architectural Desktop structural objects or AutoCAD DWG drawings.
<b>Tekla</b> <a href="http://www.tekla.com">www.tekla.com</a> 877.TEKLA.OK	Tekla Structures—Standard Design	An intuitive multi-material, load, and connection modeling solution for visual design. Models can be exported to the analysis engine of choice. Analyzed models can be re-imported for automated design drawing creation.
	Tekla Structures—Engineering	A fully integrated engineering analysis solution with intuitive modeling capabilities combined with load modeling functionality. Loaded design models are integrally analyzed inside this software, which contains the STADD.Pro analysis engine.
	Tekla Structures—Full Detailing	The evolution of Xsteel. It has the ability to create comprehensive production models and fabrication/detail drawings for structural steel.
	Tekla Structures—Project Management	Tekla provides the ability to apply and automatically extract critical management attributes in all Tekla Structures-based models. Project Management provides access to this information without the need to manipulate construction geometry.
<b>TekStar International Corporation</b> <a href="http://www.tekcad.com">www.tekcad.com</a> 407.865.6996	TekCAD2	A free-form 3D geometric modelling system for designing and analyzing structural frameworks.
	TekKit	Plastic components for quickly building models of structural frameworks.



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<b>The Steel Joist Institute</b> <a href="http://www.steeljoist.org">www.steeljoist.org</a> <b>843.626.1995</b>	Computer Vibration Program and TD #5	A Windows-compatible DOS program developed by SJI to assist the qualified Professional Engineer in determining probable transitory vibration characteristics for floor systems employing open web steel joist/concrete slab floor construction. The program allows the specifying professional to quickly calculate the frequency and amplitude resulting from transient vibration caused by human activity. Primary support systems consisting of joist girders or structural steel beams can also be analyzed as part of the steel joist/concrete slab floor.
<b>Vahe Mn</b> <a href="mailto:vahemn2000@yahoo.com">vahemn2000@yahoo.com</a> <b>98.218.876.6394</b>	SIDOS 99-V1	Intelligent design and generation of alternative optimized I and box shaped steel members, built-up from plates, and subject to axial load and flexure. Regard to the user-defined section dimension limits (AISC 1999 LRFD non-compact sections).

## product case study

### MicroStation—Marquette Interchange, Milwaukee

BY CHRISTINE BYRNE

**THE REBUILDING OF MILWAUKEE'S MARQUETTE INTERCHANGE IS ONE OF THE LARGEST TRANSPORTATION PROJECTS UNDERWAY IN THE UNITED STATES. AMONG THE MANY CHALLENGES OF THIS \$810 MILLION PROJECT WAS THE DESIGN OF MORE THAN 50 BRIDGE STRUCTURES.** Eight curved steel box girder bridges on high-level system interchange ramps, at heights of up to 125', range in length from 900' to more than 2,000' and have spans of up to 250' long.

The Milwaukee office of CH2M HILL was responsible for the project's design work, which began in 2001. The design team applied Bentley Systems, Inc.'s MicroStation VBA technology and innovation to save its client—the Wisconsin Department of Transportation—and the public both time and money.

"We made a considerable improvement on the conventional delivery model by developing a series of MicroStation VBA (Visual Basic for Applications) and Visual Basic programs that take advantage of the structured nature of bridge design to automate portions of the detailed design phase," said Kevin Willis, bridge engineer for CH2M HILL.

"The new approach saved time and also helped ensure consistent flow of information without errors throughout the design process," he continued.

The new process did not change the initial stages of the conventional delivery model. Special-purpose design tools, of which Bentley's InRoads played a vital role, were used to create the basic geometry parameters for the design. SAP software was used to perform the structural analysis.

From this point, however, the method used by CH2M HILL was markedly different. Willis developed a custom automation tool that read the output of the design software and then generated a text file in a standard format that contained information needed to create each drawing. Besides the basic geometric information, the file contained line weights, line styles, seed files, reference and border files, dimensions, text sizes, text content, and other information.

These text files simplified the programming task by providing only the parametric information that defined the design. Willis created a MicroStation VBA program that read the text files and created finished deliverable drawings based on the files' content.

"Our new approach streamlines the design process by automating the most tedious aspects of the design process," Willis said. "Once the macros were debugged, they could be used to automatically produce drawings that accurately reflected the design intent."

"As a result, the quality assurance process was simplified to the task of making sure that the design software was producing cor-



Rehabilitation of Milwaukee's Marquette Interchange began in 2004 and is expected to be completed in 2008.

Courtesy Bentley Systems, Inc.

rect results and that the finished drawings accurately reflected these results," he continued. "Automating the drawing process also ensured consistency across drawing sets."

Design changes could be accommodated with considerably less effort than was required in the past. Once the updated geometry had been created in the design software, an automated process was used to regenerate the drawings based on the new design intent.

The time required for checking the new drawings was reduced because the in-house and MicroStation VBA automation tools had already been verified as generating drawings that reflect the design software output.

Variations on the basic approach were used in several areas, including the design and detailing of a wide range of pier shaft sections, as well as the finished deck elevations for a number of structures.

"The custom code developed with MicroStation VBA allowed us to deliver bridge design services with increased efficiency, while maintaining the high level of quality the Wisconsin Department of Transportation is accustomed to receiving from CH2M HILL," Willis said.

Christine Byrne is Media Relations Manager for Bentley Systems, Inc.