

AMERICAN INSTITUTE OF STEEL CONSTRUCTION
The Wrigley Building, 400 North Michigan Avenue
Chicago, IL 60611

Address Correction Requested

A9.29-5

BULK RATE
U.S. POSTAGE
PAID
Permit No. 120
Brookfield, WI 53005

MODERN STEEL CONSTRUCTION

NUMBER 5 • 1989

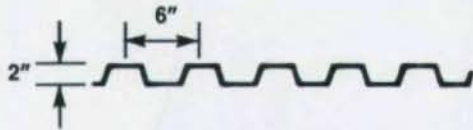


THIS ISSUE

Steel's a Natural for Congregate Housing
Look of the Nineties — In Steel
Preview Kansas City—1990
National Steel Construction Conference
Training for the Real Thing!

SPECIAL SECTION:
1989 PRIZE BRIDGE AWARDS

No. 12 FORM DECKS



SECTION PROPERTIES

GAGE	METAL t	I	Sp	Sn
24	.0239	0.231	0.192	0.206
22	.0295	0.299	0.253	0.270
20	.0358	0.378	0.326	0.346
18	.0474	0.527	0.471	0.497

**2" x 6" 30" COVER
EXTRA HEAVY DUTY FORM**

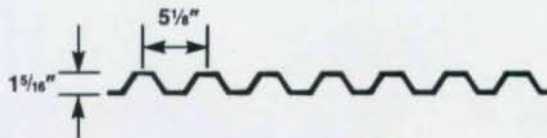
UF2X

- Ribs can accept a 3/4" stud
- Available vented (UF2XV) for lightweight fill roofs

**1 5/16" x 5 1/8" 36" COVER
HEAVY DUTY FORM**

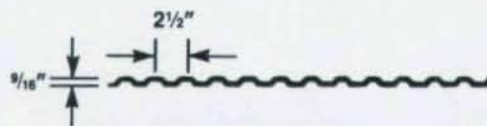
UFX-36

- Ribs can accept a 3/4" stud
- Available vented (UFXV-36) for lightweight fill roofs



SECTION PROPERTIES

GAGE	METAL t	I	Sp	Sn
26	.0179	.071	.086	.096
24	.0239	.101	.125	.141
22	.0295	.130	.164	.183
20	.0358	.164	.212	.225



SECTION PROPERTIES

GAGE	METAL t	I	Sp	Sn
28	.0149	.012	.036	.039
26	.0179	.015	.046	.048
24	.0239	.022	.070	.070

**9/16" x 2 1/2" 30" COVER
STANDARD FORM**

UFS

- Diaphragm values are available for all three form decks.
- Composite beam and girder tables are available for UF2X & UFX-36.
- A complete line of bridge form decking is also produced by USD.



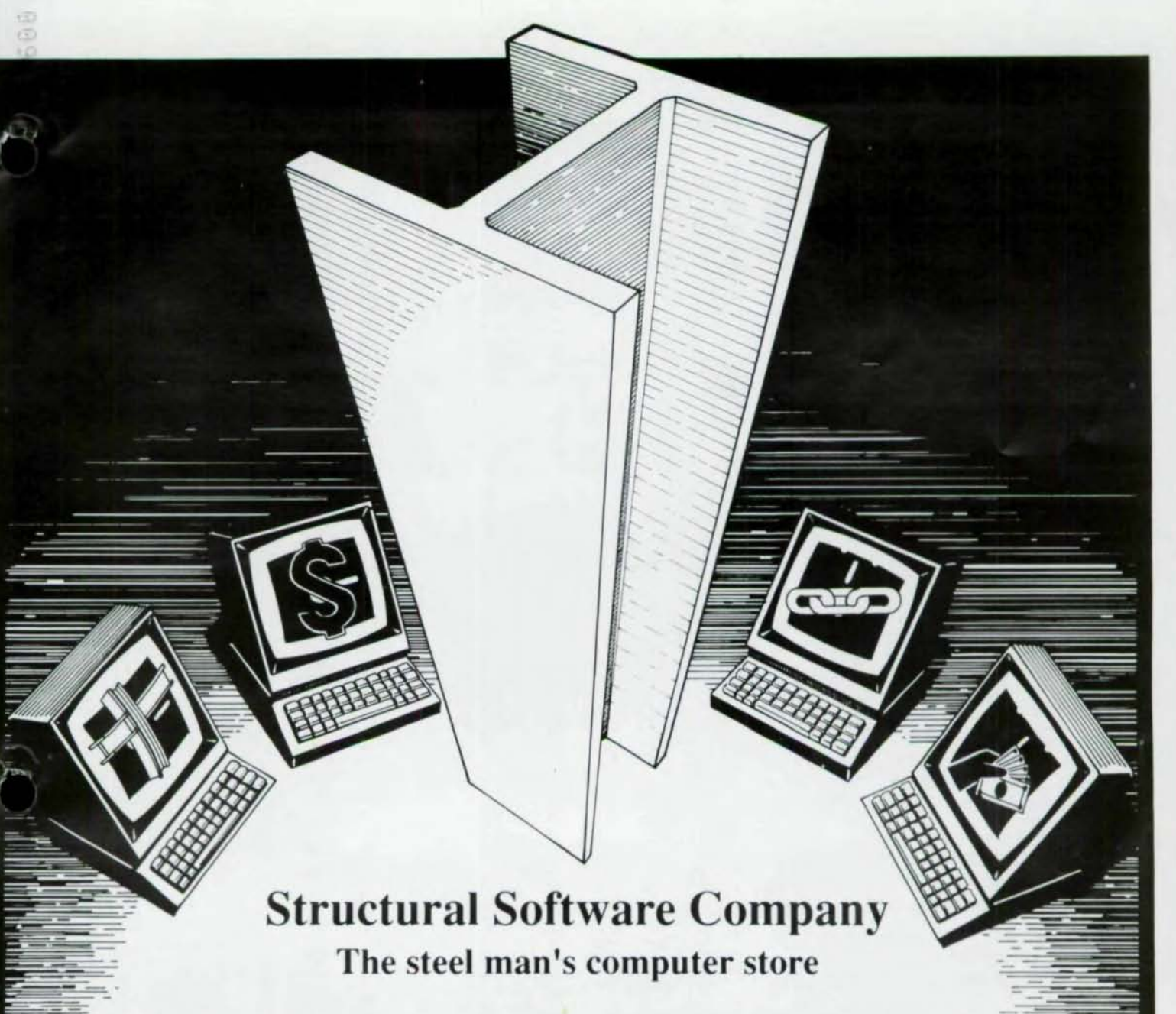
NICHOLAS J. BOURAS, INC.

P.O. BOX 662, 475 SPRINGFIELD AVE.

SUMMIT, NEW JERSEY 07902-0662 (201) 277-1617



ASSOCIATE MEMBER



Structural Software Company

The steel man's computer store

Jim Bolling, President and CEO of the Structural Software Company, is a second-generation steel man. His fifteen years spent managing a 5,000 ton per year family fabricating shop gave him the insider's perspective.

This understanding of the steel man's needs has shaped every program the Structural Software Company markets.

Our programs speak the language of steel, instead of requiring you to become a programmer. And, they are designed to work with you, the way you work. To reduce the time and the costs between the bid and the invoice.

It's a tough business. You need programs that work hard, not those that make your work harder.

FabriCAD, our computerized detailing program, is designed to cut through the steel man's stubbornest logjam -- the long waits on details and shop drawings. You can gain control over your schedule and budget, and smile at change orders.

Estimating thinks the way you do, and takes into account everything that needs to happen. In an intensely competitive climate, Estimating lets you capitalize upon your shop's unique strengths to generate faster and more profitable quotes.

Material Allocation lets you develop purchase orders by multing and combining your materials. Combine materials for mill or warehouse buying, and mult against

your inventory, to recycle drops and never run short. Create cutting lists that will let you mark each beam with the job numbers and piece marks of the pieces you will cut from it.

If you also sell metal over the counter, **Point of Sale** will let you offer quotes over the phone, based upon material, tax, and labor costs, as well as the client's credit standing.

All of these programs run on IBM-AT compatible microcomputers.

Call today, and talk to some people who can speak your language.

Structural Software Company
PO Box 19220
Roanoke, VA 24019
(703) 362-9118

MODERN STEEL CONSTRUCTION

VOLUME XXIX • NUMBER 5
SEPTEMBER-OCTOBER 1989

American Institute of Steel Construction, Inc.

The Wrigley Building
400 North Michigan Avenue
Chicago, Illinois 60611-4185
Phone: 312 / 670-2400

OFFICERS

Ralph H. Clarbour
Chairman
Stephen E. Egger
First Vice Chairman
Frank B. Wylie III
Second Vice Chairman
Oscar W. Stewart, Jr.
Treasurer
Neil W. Zundel
President
David Ratterman
Secretary & General Counsel
Lewis Brunner
Vice President, Membership Services
Geerhard Haaijer
Vice President, Technology & Research
Morris Caminer
Vice President, Finance/Administration

EDITORIAL STAFF

George E. Harper
Editor
Lona Babbington
Business

ADVERTISING REPRESENTATIVE

Pattis-3M
Eric K. Nieman
4761 West Touhy Avenue
Lincolnwood, Ill. 60646
312/679-1100
FAX 312/679-5926

ON OUR COVER

Sam Houston / I-10 Interchange,
Houston, Texas. See special Bridge
Awards Section starting on p. 33.

-
- 9 Mayflower Place
Steel's a Natural for Congregate
Housing



-
- 14 Northwest Passage
Look of the Nineties—in Steel



-
- 20 Preview Kansas City—
1990 National Steel Construction
Conference



-
- 27 Aegis Pre-commissioning Unit
Training for the Real Thing!



-
- 30 Steel Notes

-
- 33 SPECIAL SECTION:
1989 AISC Prize Bridge Awards



NONLINEAR FEA ANALYSIS PLUS DESIGN ON YOUR PC. \$4,990

SCADA/PC-S1: \$2,800

This general purpose program has everything most structural engineers need. Features such as: 2D and 3D linear analysis with P- Δ effects. Out-of-core routine for virtually unlimited-size structures. Steel and concrete design. Interactive graphics with stress contours. Macro-programmable query language. Mesh generation.

SCADA/PC-S2: \$3,800

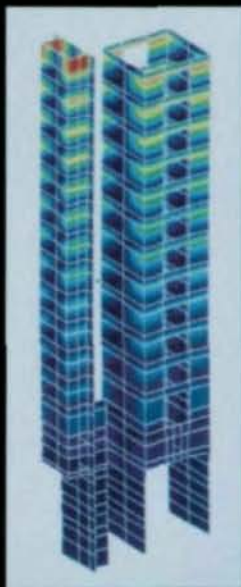
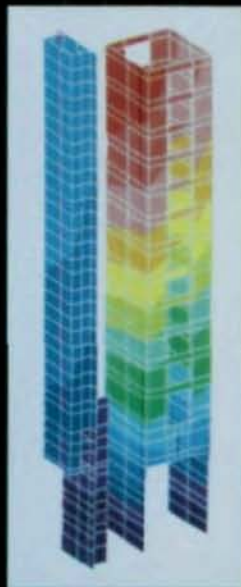
All the features of SCADA/PC-S1 plus time history, response spectrum, and buckling.

SCADA/PC-S3: \$4,990

All the features of SCADA/PC-S2 plus material and geometric nonlinearities.

All three SCADA packages include the following elements: 3D truss, 2D and 3D beam, 3 & 4-node thin plate/shell, 3 to 9-node thick plate/shell, plane/axisymmetric, and 4 to 27-node solid.

Other SCADA modules include nonlinear heat transfer and fluid flow. Prices shown are for PC-version only. SCADA versions for SUN, VAX, and APOLLO are also available.



Scada



AMERICAN COMPUTERS & ENGINEERS
11726 San Vicente Blvd., Suite 212
Los Angeles, CA 90049, USA
Tel: (213) 820-8998 Fax: (213) 826-1964
Telex: 493-0363 ACE UI



Ingenious
New
Steel Detailing
Device.

One finger is all it takes to run the world's best selling steel detailing computer software, **Steelcad II**. One finger, to cut the production of one 24 x 36 detail drawing from 6 hours to under 60 minutes. One finger to sort, weigh, price, categorize and total all material, all the way through to an exact bolt count. Just one finger to save thousands of man-hours in drawing revisions, design and fabrication errors, and production scheduling.

The way we see it, **Steelcad** makes your finger the biggest breakthrough in steel detailing instrumentation since the invention of the pencil eraser. So use it right now, by calling toll free for a complete demonstration.

Steelcad II
AUTOMATIC PIECE BY PIECE DETAILING

Steelcad III
AUTOMATIC DETAILING FROM ERECTION PLANS



550 Alden Rd. Ste. 201
Markham, Ontario
Canada L3R 6A8

1-800-387-4201

OUR WELDING PRODUCTS ARE UNSEEN IN ALL THE RIGHT PLACES.

BP America's corporate headquarters in Cleveland, Ohio leaves a lasting impression on everyone who sees it.

What they don't see is the contribution of Lincoln Electric.

Using Lincoln Innershield® self-shielded FCAW welding electrode, Lincoln lightweight air-cooled guns, and Lincoln power sources, operators were tested and qualified with minimal training.

Unlike conventional gas-shielded processes, with Innershield, operators could work in tight situations, free from cumbersome gas cylinders, hoses, and restrictive shielding curtains.

Portable Lincoln wire feeders simplified continuous welding on long joints and virtually eliminated stops and starts. Easily adjusted for voltage and wire-feed speed, they provided full welding flexibility.

What's more, Lincoln provided expert technical assistance to keep each welding application running smoothly.

If you're working on the kind of project that people are going to notice, specify Lincoln Electric.

The results will be as enduring as they are endearing.

LINCOLN
ELECTRIC

Where productivity isn't a foreign idea.

For more information about Lincoln welding products, contact your Lincoln distributor or The Lincoln Electric Company, 22801 St. Clair Ave., Cleveland, Ohio 44117-1199.



Bank of China invests in connection security

DTIs used on 1,209-foot headquarters building in Hong Kong

High, accurate clamping forces are essential in slip-critical connections of high-rise buildings. But when the building is the fifth tallest in the world and wind load requirements are extreme—two times those of New York and four times larger than the equivalent earthquake load requirement of Los Angeles—these clamping forces become all the more important.

That's why Direct Tension Indicators were specified by Leslie E. Robertson Associates

and used on the soaring Bank of China tower in Hong Kong.

Not only do Direct Tension Indicators assure proper bolt tension every time, so there's no guesswork, but they also eliminate expensive, inaccurate, and potentially hazardous torque wrench inspection. Plus, DTIs save on inspection costs.

Direct Tension Indicators from J&M Turner, Inc. An excellent investment in quality assurance. Specify American-made Direct Tension Indicators to ASTM F959-85 on your next structural steel project.

For more information, write to:
Jonathan Turner, J&M Turner, Inc.,
1300 Industrial Blvd., Southampton, PA 18966.
Or call 1-800-525-7193.



J & M Turner Inc.

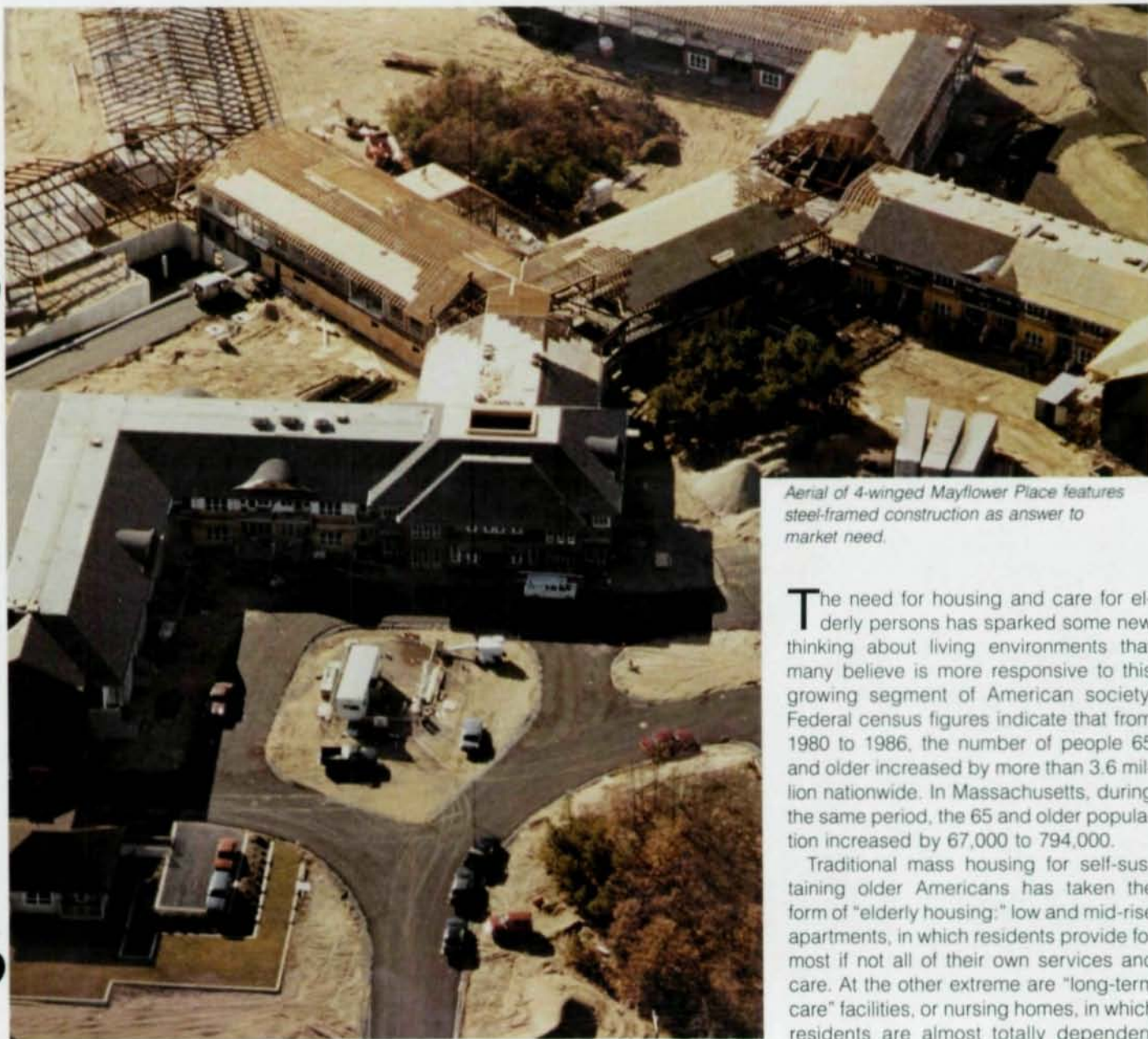
The bolting quality assurance people.

New Markets in Steel

MAYFLOWER PLACE

Steel's a Natural for Congregate Housing

by Stephen K. Crockett



Aerial of 4-winged Mayflower Place features steel-framed construction as answer to market need.

The need for housing and care for elderly persons has sparked some new thinking about living environments that many believe is more responsive to this growing segment of American society. Federal census figures indicate that from 1980 to 1986, the number of people 65 and older increased by more than 3.6 million nationwide. In Massachusetts, during the same period, the 65 and older population increased by 67,000 to 794,000.

Traditional mass housing for self-sustaining older Americans has taken the form of "elderly housing," low and mid-rise apartments, in which residents provide for most if not all of their own services and care. At the other extreme are "long-term care" facilities, or nursing homes, in which residents are almost totally dependent



Drive-in trellis at main entrance of retirement center (above). Residential courtyard (r.) features gazebo, greenhouse solarium.

upon on-site staff for day-to-day dining, health and social services.

A recent alternative living environment for senior citizens is called the "continuing care retirement community" or congregate housing. It is estimated that 700 such communities already exist nationwide, with a majority concentrated in Florida, California and Pennsylvania.

In planning Mayflower Place, a 60-bed Level II/III nursing home and 102-unit con-

gregate housing project in Yarmouth, Cape Cod, Massachusetts, the architect set out to create a non-institutional environment to provide residents with privacy and substantial independence. At the same time, this "life-care" facility had to be a self-contained community, with an infrastructure offering a complete range of services so residents could develop a lifestyle tailored to their own particular capability and temperament.

Structural Steel Key to Framing

Typical of many congregate housing communities, Mayflower Place is low-rise, only two-stories, with one-story for the nursing home. But the building program is substantially more comprehensive and complex than any other form of elderly living environment. And that is the key to the suitability of structural steel for the framing of congregate housing communities.

This \$20-million development, located

**FOR
ALL
YOUR
STRUCTURAL
FASTENER
NEEDS
SPECIFY
ST. LOUIS!**



ST. LOUIS SCREW & BOLT COMPANY

St. Louis Screw & Bolt makes a FULL range of structural fasteners. We produce Types I & III A-325 bolts, ASTM A-307 bolts, and have the capability to manufacture fasteners to YOUR specifications. At St. Louis Screw & Bolt, we practice accepted quality control methods to insure that you receive the best products available. ALL materials we use are traceable to steel melted and manufactured in the USA. And each production run, traceable to a heat lot of steel, is certified to meet ASTM specifications.

**FOR THE QUALITY SOLUTION
TO ALL YOUR STRUCTURAL
FASTENER NEEDS, SPECIFY
ST. LOUIS!**

ST. LOUIS SCREW & BOLT COMPANY

6900 N. Broadway • St. Louis, MO 63147 • 314/389-7500



Since 1887



FAX: (314) 389-7510
1-800-237-7059





Residential courtyard looking toward dining room (above). Second floor and roof steel-framed for dining room and cathedral ceiling.

on a 40-acre site on Cape Cod, offers residents a private apartment. In addition, these services are available:

- Dining alternatives (in-room or at common facilities);
- Housekeeping and linen;
- Medical emergency response;
- 24-hour security;
- Maintenance; and
- A full range of social and recreational programs.

Consider the amenities offered at Mayflower Place for the active life style: fully equipped spa with whirlpool and indoor swimming pool; game rooms; lounges; beauty parlor/barber shop; library; chapel; meeting rooms; theater; gazebo courtyard; walking trails; central common area; bank; post office; cafe; and gardening areas. In thinking about how this kind of program can be accommodated within a two-story residential building that must be tailored for senior citizens, perhaps the reader can understand the complexity of the design required.

Structural Considerations

A total of five framing systems were evaluated during the preliminary design phase. The nursing home required by code in Massachusetts, a fireproof, non-combustible frame (fire-treated lumber is not acceptable). For the congregate housing, a structural fire rating was not required by code, thus conventional wood framing was a possible choice; wood is a traditional material for both structural and exterior cladding on the Cape. However, the owner, an experienced developer of congregate facilities, decided a non-combustible structure was essential for fire-safety and marketing purposes. The owner also provided complete sprinkler protection, which is not required by code. As it turned

out, the complexity of the building program was such that wood framing would not have worked well anyway.

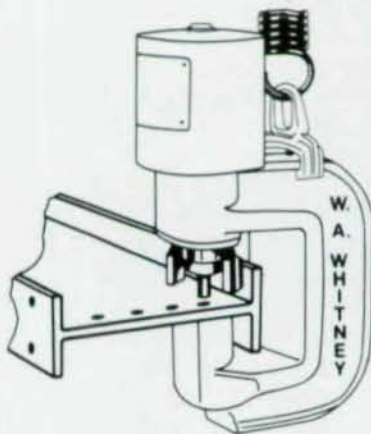
Since the soil condition is loose Cape Cod sand with an allowable safe bearing capacity of about one-ton per sq. ft, a light structure was desired. Reinforced concrete or masonry would have produced significant penalties in the foundation. And, the flexibility in locating gravity load components to accommodate the com-

plex program would have been severely restricted.

The selection quickly focused on a steel frame with either cold-formed joists, composite beams or bar joists (composite or conventional) for the floors. After comparative economic studies by the construction manager, the final selection of a concrete slab on composite steel joists was made.

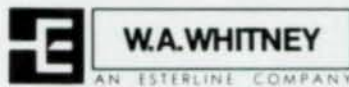
Mayflower Place contains three basic

PORTABLE POWER with W.A. Whitney's Portable Presses



Punching is one of the least expensive ways of making holes in structurals. When using W.A. Whitney's Portable Presses, you save time and expense when punching wide flange beams, columns, channel iron, angle iron, I-beams, plate and other materials.

- Portable—Take press to work site
- Saves Time—Reduce material handling
- Powerful—Punch up to 3" diameter holes



W.A. Whitney Corp.
650 Race Street
P.O. Box 1206
Rockford, Illinois 61105-1206
(815) 964-6771 Fax: (815) 964-3175

W.A. Whitney offers portable presses with punching power from 20 tons through 250 tons. Talk to your W.A. Whitney distributor. Call or write today for our portable press catalog.



Core intersection, with pipe collar to ease fabrication of ridge/valley connections.

connections are as much a part of the building structure as the members they are connecting.

Initially, blast cleaning and high-quality, lead-free shop painting of all structural steel was contemplated because of the location in a salt-air environment. However, upon further inspection and recommendations offered by the steel bidders, this requirement was deleted (except for the swimming pool structure and balcony support steel) and the steel remained unpainted, resulting in a savings of \$50 to \$60 per ton for the owner. Steel within the indoor pool area had an SSPC-SP6 commercial blast cleaning followed by a total of 10½ mils dry thickness of zinc-rich and high-solids epoxy paints, all shop-applied. The balcony support steel received an SSPC-SP3 power tool cleaning and a two-coat application of a polyurethane primer, 5 mils total dry thickness.

apartment types, and is laid out as a series of two-story wings that frame into several central core areas. Due to site restrictions, i.e., property line setbacks and wetlands protections, the wings enter the core areas at various skews. The main core, comprised primarily of the Center and South Wings, contain most of the common spaces and amenities. The East, North and West Wings have dwelling units, except for the far end of the West Wing, which houses the indoor swimming pool and fitness center. The South Wing ties into the one-story nursing home.

Each wing at Mayflower Place is 55 ft wide. Longitudinal lines of TS4×4 columns run along both exterior walls and each side of the 6-ft wide corridor in each wing. Tubular columns minimized the width and fit entirely within the 4-in. corridor studs. The longitudinal spacing of the interior and exterior columns varies from about 12 ft to 23 ft. The transverse spacing between the exterior and corridor walls varies from 23 to 26 ft. The four lines of relatively close-spaced columns, supporting both the floor and roof framing, was necessary to adequately distribute gravity and lateral loads to the sandy soil through a conventional spread-footing arrangement. Fourteen-in. deep composite steel joists and wide-flange steel girders support a 3-in., 3,000-psi, concrete slab and span the 23- to 26-ft width from the corridor column lines to the exterior. Across the corridor's 6-ft width, shallow, composite sections are framed, providing sufficient ceiling space below to conceal the plumbing and mechanical equipment. The girders are typically W12×19's or W14×22's, all ASTM A36 steel. Comparative ASTM A572, Gr. 50 steel did not reduce costs, due mainly to the "lightness" of the A36 sections within the wings and deflection/

vibration characteristics at the open core areas.

Because of the dampening losses on the second-floor open common spaces, the slab thickness was increased to 3½ in. as a result of studies conducted with the joist manufacturer to control transient vibrations to acceptable levels. Lateral load resistance is provided mostly by two-story tubular braced frames. The major exception to this framing system occurs in the swimming pool area. Here, W8×67 exterior columns support W18 girders clear-spanning the 55-ft width. W12 spandrel beams with field-welded flange moment connections to the W8 columns provide the lateral load resistance required.

Responsibility for Design

All connections of beams to tube columns are simple, with through-plates welded to each column face. The connections were initially designed by the steel fabricator and checked during the shop drawing submission by the structural engineer's office for conformance with the contract drawings (which specified the end reaction requirements) and the AISC specifications. For the most part, the connection types and details were left to the discretion of the steel fabricator, since connection particulars vary from shop to shop. This author, however, adheres to the philosophy that the responsibility for the adequacy of the connection design should fall upon the building's structural engineer. Statutes throughout this country impose this responsibility and exempt from certification, licensing and review, owners and employees of steel fabrication facilities. In the opinion of this author, registered engineers should not delegate connection design responsibility to laymen, since the decisions and calculations necessary for the

Skews Challenging

Perhaps the most challenging aspect of structural design for Mayflower Place was dealing with the skews at the multiple-wing intersections and the hipped roof framing. Wood trusses were selected for the primary roof framing in the wings of the retirement community. Since their support consisted of four parallel lines of steel girders (one at each exterior and corridor wall), with only minimal steel framing perpendicular to the supports, the frame proved difficult to plumb until the trusses were fastened and sheathed. In addition to skews, a two-story open cathedral space had to be framed at the main entrance lobby.

There is no question that structural steel assisted the architect in providing Mayflower Place with the kind of sophisticated program the owner wanted to offer. Increasingly, owners will be addressing the marketability of retirement communities and looking for such features as fire-safety, interior flexibility, multi-use and well-finished interiors. □

Architect

Architecture Company, Inc.
Lexington, Massachusetts

Structural Engineer

S.K. Crockett Associates, Inc.
Norwood, Massachusetts

Construction Manager

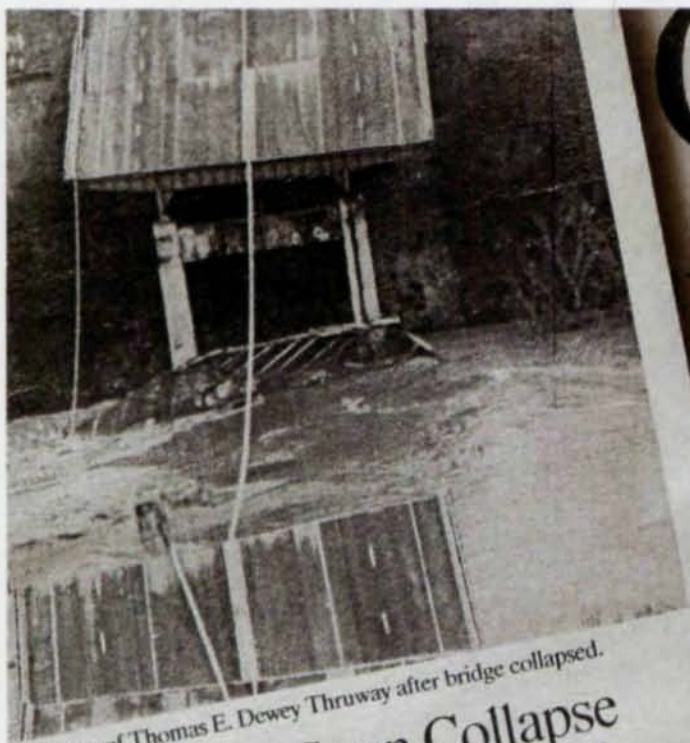
Quannapowitt Development Company, Inc.
Wakefield, Massachusetts

Owner

Yarmouth Mayflower Place, Inc.
Weston, Massachusetts

Stephen K. Crockett, P.E., is president of S.K. Crockett Associates, Norwood, Massachusetts.

When The Bridge Was Out, We Came Across.



Aerial view of Thomas E. Dewey Thruway after bridge collapsed.

Thruway Span Collapse Threatens Upstate N.Y.

15-MILE DETOURS SEEN FOR COMMUTERS

AMSTERDAM, N.Y. — There's no getting around it — without a lot of difficulty, that is. The Schoharie Creek Bridge failure last Sunday is going to be headaches for automobile commuters, as the Thruway

that's not even counting delays to be added due to extra traffic. Because the bridge is expected to be out for nearly a year and a half, highway officials have asked businesses along the route to consider changing their hours of operation to allow motorists the extra increase traffic problems during rush hours.

Collapse Upstate N.Y.

BRIDGE COLLAPSE IN NEW YORK

All Other Bridges
To Be Checked For

AMSTERDAM, N.Y. — New York State Thruway faces a year or more of detours. The collapse occurred on the morning of the Sunday

New York Thruway Extended

Few Alternatives Seen For

ALBANY, N.Y. — New York State Thruway officials are in a quandary following the Sunday collapse of the Schoharie Creek Bridge in upstate New York near Amsterdam. More than 800

It was the worst flooding upstate New York had seen in thirty years.

As the swollen waters of the Schoharie Creek raged out of control, the four-lane bridge above it gave way. So, the New York State Thruway Authority faced some tough problems. They simply couldn't afford a prolonged bridge closure at this vital link of Interstate 90.

They didn't have to. The bridge fabricator responded to the urgent need with a tight delivery schedule. And Lukens backed our customer by committing to quick delivery of stripped steel plate. We both came across — two of the reasons the bridge was finished in nine months instead of the original estimate of eighteen.

Stripped plate comes from Lukens flame cut

up to 1250" long and down to 10" wide. So you don't need to invest in cutting equipment or use up valuable manpower and shop space. It's also delivered with prepared edges ready for fabrication. So it saves you time as well.

Solid reasons to consider Lukens stripped plate the next time you want to go over big. Ask for our brochure when you call Bob Wright, Application Engineering Manager, Lukens Steel Company, Coatesville, PA 19320. (215) 383-3342.

Lukens Steel
The specialist in plate steels.

NORTHWEST PLAZA

A Look of the Nineties—in Steel

by Alan Elfanbaum



Completed North Feature Court with sculptured columns and exposed steel grillage above.

In November, 1989, the third and last phase of the \$60-million expansion of Northwest Plaza will open to the public. Already Missouri's largest retail shopping center, the addition of over 300,000 sq. ft. of new mall space will make it one of the largest retail complexes of its kind in the country. Over 1,900 tons of structural steel and 400 tons of steel joists were used in the complex addition and enclosure.

Architectural Concept

The architect began working on this project over three years ago, having earned

this commission as the result of a highly publicized design competition. The formidable challenge was to take what was once called the world's largest open-mall shopping center and not only to enclose the open garden courts but also to tie together nine prominent "free-standing" buildings into a unified theme. The European owners of the project were looking for a high-tech, space-age environment, emphasizing clean, strong lines and a crisp merchandising presentation for the nineties.

The structure itself was to play a crucial

role in both the form and character of interior spaces and would be carried outside the building to form each of Northwest's six feature entrances. Sculptured metal-strip vaulted ceilings were selected as an innovative solution for joining the various elements together, converging at the Feature Courts, which would be accented with palm-like sculptural steel ornamentation and metal edge clear glass cube kiosks. Even the floor tile would take on the characteristics of a geometric optical illusion, which along with interior finishes, would reiterate the more subtle aspects of the

exposed structural steel grillage above.

The finished project, as it unfolds, already gives promise as a unique and innovative addition to St. Louis' other recent premier retail complexes.

Elegance with Economy

In the almost one-half mile of its length, the main axis of the complex accommodates some seven separate sub-malls and three large Feature Courts distributed along its length. The court roofs rise some 40 ft above the main mall level and incorporate over 50,000 sq. ft of open space within their confines.

To create an intricate and interesting exposed roof structure, various schemes were considered, including standard space frames of various configurations, along with more conventional types of framing. The solution, finally selected, combined economy with grace, as elegantly sculptured columns with radial eyebrows rise to a two-way truss system, which spans up to 80 ft between supports.

Custom-made, long-span joists have modular panel points that match truss web member spacing. Special bottom chord, double-angle bridging matches joist chord member sizes to create an interesting three-dimensional effect. And perimeter skylights enclose and highlight the exposed structure along with special lighting and finishes to enhance the overall effect.

The primary steel columns and long-span trusses provide the required two-way rigid frame stiffness for lateral loads and foundation fixity is taken advantage of where possible. For economy, the balance of the mall construction utilizes cross bracing elements, where allowed, in demising partitions between tenant spaces.

St. Louis Arches

The arch motif is carried out at each major entrance to the complex, with the highlight being the St. Ann's Entrance, which provides primary access to the new mall in-fill. The 50-ft high arched promenade (formed to a 16 ft-3 in. radius) is made up of five heavy 14-in. wide-flange shapes designed as rigid frames, fixed at the base.

The steel fabricator investigated several different methods to provide the close tolerance requirements of the finished profile and finally selected the relatively new method of induction heat bending. In this process, a steel section passes through an induction coil, which electrically heats short lengths of steel to forging temperatures. The heated section is bent to the required radius as it is cooled simultaneously in a controlled process.

A 1/4-in. tolerance was maintained for the

FastFrame™

An essential tool for every design office

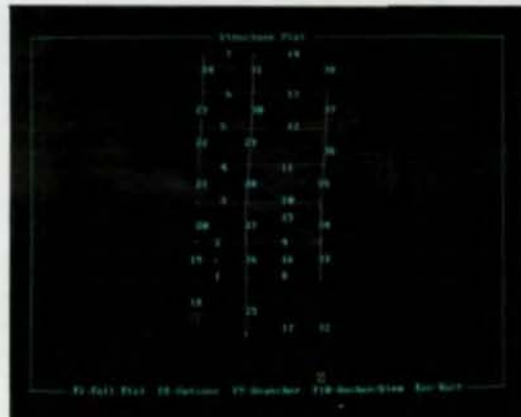
Integrated Editing, Analysis, Graphics, AISC Design, and AISC Verification of 2D Structural Frames

At Last a revolutionary application using everyone's favorite software...**Lotus 123®**. Now you can completely analyze and design 2D frames, trusses, bracing, and beams with lightening speed and superb graphics within 123. **FastFrame** also gives you on-line help, mouse support, true spreadsheet entry, single keypress control, and **exceptional speed** in a very refined package.

AISC & USER DEFINED DATABASES

- View a "Pop-up" window to scroll through and select the section you need.
- Over 2,700 sections from the 6th, 7th and 8th edition AISC handbooks, including L, LL Jr., Tees, and others.
- Build your own additional database of frequently used sections for use on all future jobs.
- Numerical accuracy maintained with all AISC values.

Section Label	Area	Depth	Width	T	Ix	Iy	Rxx
W14x42	12.20	22.74	7.840	0.509	0.430	152.00	24.500
W14x48	13.40	22.74	7.840	0.509	0.430	152.00	24.500
W14x54	14.70	22.74	7.840	0.509	0.430	152.00	24.500
W14x60	16.00	22.74	7.840	0.509	0.430	152.00	24.500
W14x68	18.00	22.74	7.840	0.509	0.430	152.00	24.500
W14x74	19.50	22.74	7.840	0.509	0.430	152.00	24.500
W14x82	21.50	22.74	7.840	0.509	0.430	152.00	24.500
W14x90	23.50	22.74	7.840	0.509	0.430	152.00	24.500
W14x99	25.50	22.74	7.840	0.509	0.430	152.00	24.500

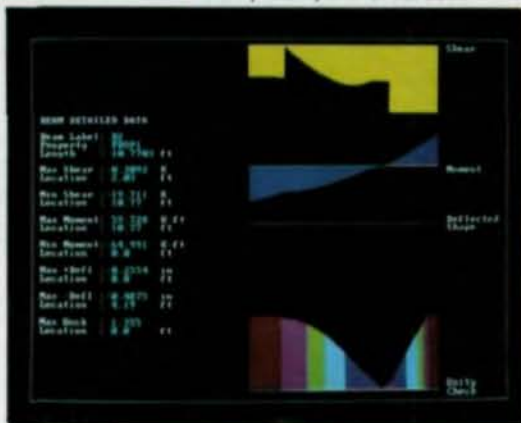


STRUCTURE PLOTTING

- Press [F6] to plot the entire frame at any time. Quickly verify your frame, loads, & boundary conditions.
- Displays static & deformed shapes.
- Members are color coded per their AISC combined stress values.
- Zoom in on any portion of the frame by "drawing a box"....just like CAD systems.
- CGA, EGA, & Hercules.

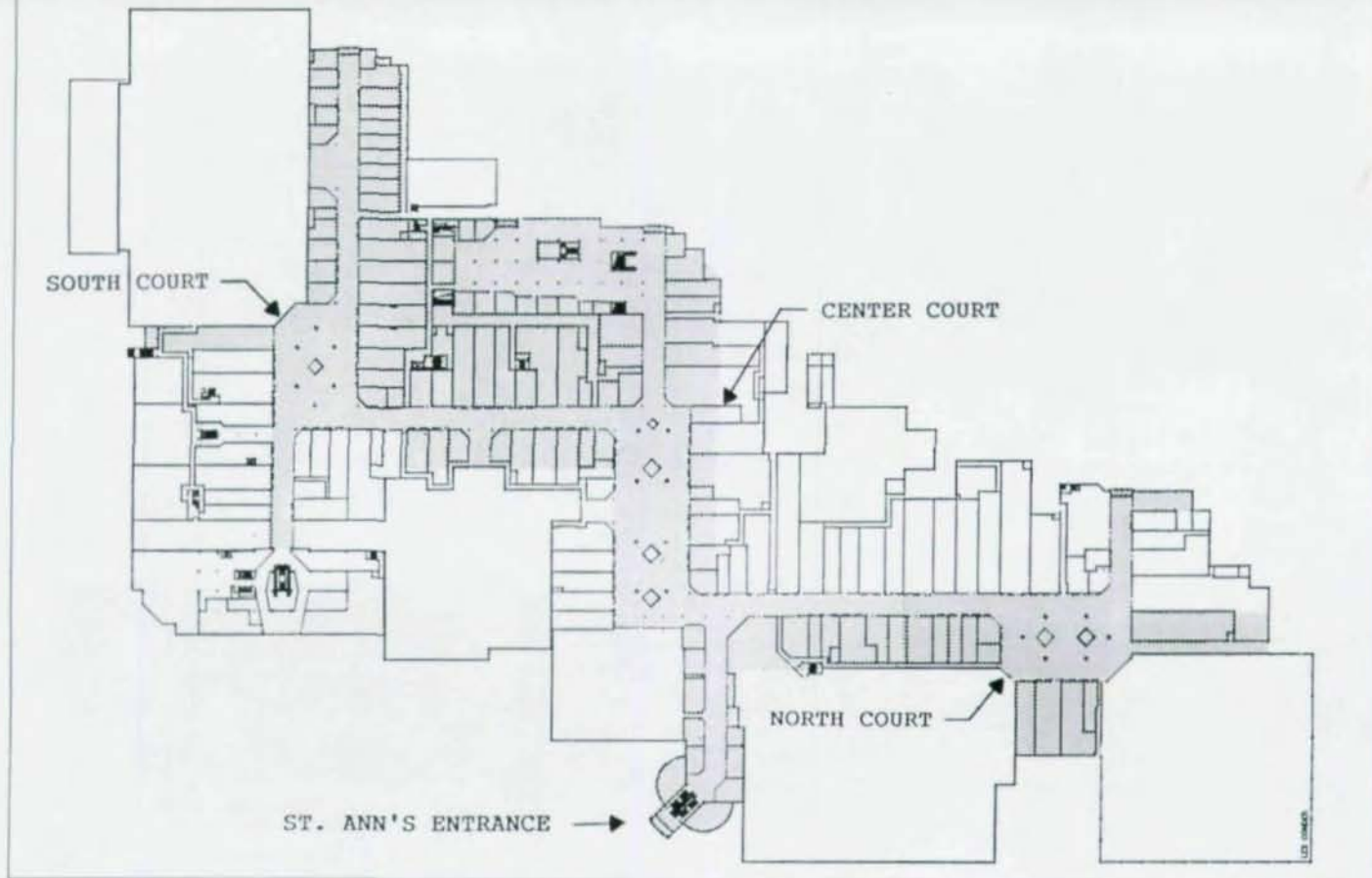
BEAM ANALYSIS & AISC VERIFICATION

- Analyze any beam by pointing to it with the cursor and pressing [F-10].
- Shear, moment, deflection, and AISC code checks @ 250 points across span. AISC check includes all sections and all appendices.
- Full color graphical plots of results.
- Allowable/actual stresses, inflection points, & more!



ENERCALC Engineering Software

Only \$650! Call Today
(800) 424-2252 / (714) 723-0295



Shaded areas of Northwest Plaza Shopping Center represent fill-in sections.

OVER 20 YEARS
OF USE BY OVER 2000 FIRMS!

FREE!!

PLANE FRAME ANALYSIS PROGRAM

That's right, for just a nominal charge to cover materials and handling (\$19), we will send you our powerful PLANE program. This is our fullblown PLANE, not a watered-down version. How can we possibly afford to do this? It is because we are convinced that once you've tried our software, you will be back for more.

You will also receive all required documentation, as well as information regarding our 80+ programs for concrete, steel, timber and post-tensioned concrete design, including design and graphics modules for PLANE. Our programs are developed to run on IBM-PC, -XT, -AT and most compatibles.



400 JOINTS
600 MEMBERS
UNLIMITED LOADS
6 LOAD CASES
LOAD COMBINATIONS
MEMBER FORCES
©1/10 pts.

THE MOST PRODUCTIVE STRUCTURAL DESIGN SOFTWARE SINCE 1966

SAI

STRUCTURAL
ANALYSIS, INC.
429 Fifth Avenue
Indialantic, Fla 32903
(407) 727-1562 or
(407) 640-6047
FAX (407) 728-1064

YES, Please send me free PLANE (\$19 to cover materials and handling.)
(Offer valid in the U.S.A. and Canada only)

NAME _____ COMPANY _____
STREET ADDRESS _____
CITY/STATE/ZIP _____
PHONE () _____ COMPUTER _____ MASTERCARD VISA
ACCT. NO. _____ EXP. DATE _____ CHECK ENCLOSED
SIGNATURE _____ DATE _____



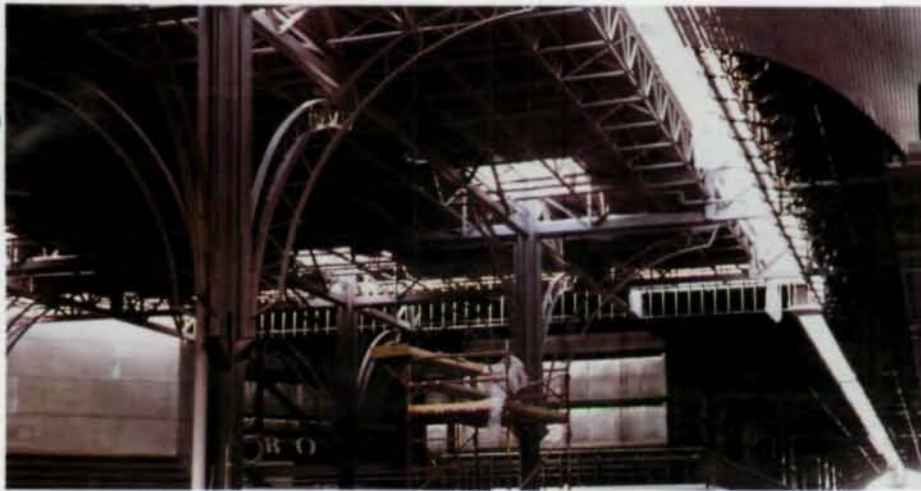
St. Ann's Entrance, with
arched steel canopy, under construction

arch frames with an acceptable level of flange distortion, which is minimal for the heavier sections. For shipping purposes, the arch frames were fabricated in two separate pieces and field-connected with full-penetrated butt welds at the ridge line.

Under-floor Grillage

The South Court in-fill had to be built over an existing garden plaza with truck dock facilities below. The existing plaza deck construction consisted of pan joist and concrete beams and the new roof above introduced column loads as high as 50

MODERN STEEL CONSTRUCTION



South Feature Court and sub-mall beyond under construction

tons in the open court areas. Existing underfloor utilities and a need to keep the loading dock area column free and in-service at all times, provided additional design challenges.

After several types of framing schemes were considered, structural steel was selected as the best solution for the complex requirements in this area. A steel beam grillage system was introduced below the existing concrete deck with the new steel columns above supported on concrete pedestals anchored to the top of the under-floor steel beams. Holes were punched through the existing deck at column locations and the concrete pedestals were kept free of the existing construction. Grillage beams were located so as to clear utilities, where possible, and where interference could not be avoided, beams were notched carefully and reinforced to provide the required clearances for both utilities and truck traffic below. Ends of grillage beams were primarily supported on new add-on concrete columns or were connected to existing concrete beams with expansion bolt connections where loads could be handled by the existing concrete construction.

The relatively light weight of the new grillage system and roof above allowed the use of existing columns and foundations without additional remedial work. Steel beam lateral bracing was accomplished by using steel straps and diagonal angle bracing to the concrete framing above.

Raising the Roof

One of the centerpieces of the new expansion will be a 100,000-sq. ft entertainment complex called Sensations. The three-level center will house a nine-screen cinema on the upper level, a 450-seat food court on the mid level and an entertainment/game complex on the lower level.

Since the structure was originally de-

signed for department store use, major reworking of the existing structure was required, including raising the roof by 15 ft, elimination of alternate rows of columns and reinforcing the upper level to accommodate a raised theater floor and an extensive projection room mezzanine above. In addition, stairs and escalators were relocated, new elevators added and floor construction removed to provide two-level open spaces.

All of the above was accomplished using structural steel solutions. The existing

roof and alternate rows of columns were removed. The remaining rows of wide-flange columns spaced at 56 ft o.c. were spliced and reinforced with flange plates to provide tubular sections capable of taking both gravity and wind loads. Cross bracing was added, where allowed, by architectural considerations and upper level floor beams were reinforced with plates, field-welded to top of bottom flanges, to upgrade their load-carrying capacity. Existing openings were infilled with steel beam and composite deck slabs and new openings framed in structural steel, as required.

One of the interesting features of the original building (built in 1965) was the incorporation of the first major installation of composite steel joists in the area. The high load-carrying capacity of these joists along with their added stiffness made them ideal for supporting the new sloping theater floor above.

Double Floor Capacity

Major remodeling of existing structures within the complex included the upgrading of over 10,000 sq. ft of concrete flat slab construction for an increase in live load capacity from 80 pfs to 160 psf, as required for a proposed heavy storage area.



Slugger
BY JANCY ENG. CO.

Model JM-100 **Slugger**® weighing only 24 pounds will cut up to $1\frac{1}{16}$ inch diameter holes in carbon steel one inch thick in seconds. This is possible only because the JM-100 accepts Jancy's patented **Slugger**® annular cutters. These **Slugger**® cutters are center free and cut only the periphery of the hole thus requiring minimal torque and thrust. The JM-100 is also heavy duty enough to convert into a magnetic drill press accepting twist drills up to a half inch in diameter. The rugged cast aluminum frame and compact 16 inch overall height is ideal for steel fabricators who have holes to cut in hard to get at places.

Jancy Engineering Co.
4616 Kimmel Drive • P. O. Box 3098
Davenport, Iowa 52808

Phone 319-326-6251 • Fax 319-326-0949 • Telex 439002

ARE BOLTS CAUSING YOU UNDUE TENSION



LEJEUNE SMART BOLTS KNOW "PROPER TENSION!"

A-325 or A-490 high strength bolts.
Factory mill certification-traceable to each keg.
Black or mechanically galvanized.
Full domestic or open stock.

"THE LOWEST COST SYSTEM FOR PROPERLY
INSTALLED HIGH STRENGTH BOLTS!"

LEJEUNE BOLT COMPANY
8330 West 220th Street
Lakeville, Minnesota 55044
For Information or Technical Assistance
Call 1-800-USA-BOLT (872-2658)
FAX 1-612-469-5893



IT IS FUN TO DESIGN STEEL CONNECTIONS

USING

DESCON

AN EASY TO USE SOFTWARE PACKAGE
FOR YOUR PC

25 TYPES OF BEAM TO COLUMN
CONNECTIONS, BEAM SPLICES AND
BEAM TO GIRDER CONNECTIONS

MOMENT CONNECTIONS
SHEAR CONNECTIONS
BOLTED AND WELDED

EXTENSIVE DATA BASE OF SHAPES,
MATERIAL PROPERTIES AND
SPECIFICATION REQUIREMENTS
INCLUDED

FOR INFORMATION CALL OR WRITE TO:

OMNITECH ASSOCIATES
P.O. BOX 7581
BERKELEY, CA 94707
(415) 528-8328

Steel again was the ideal solution with new under-floor steel beams strengthening slab column strips for positive movement. Deep column caps furnished the required support for beam connections, which are expansion-bolted directly into the cap through 15-in. deep channels to more uniformly distribute load to the concrete. Grout pads and bolted shim plates at quarter points help transfer excess slab loads to the new steel beams below. □

Architect

D.I. Architectural—Baltimore, Maryland

Structural Engineer

Siebold, Sydow & Elfanbaum, Inc.
St. Louis, Missouri

General Contractor

Pepper/Tariton (joint venture)
St. Louis, Missouri

Steel Fabricator

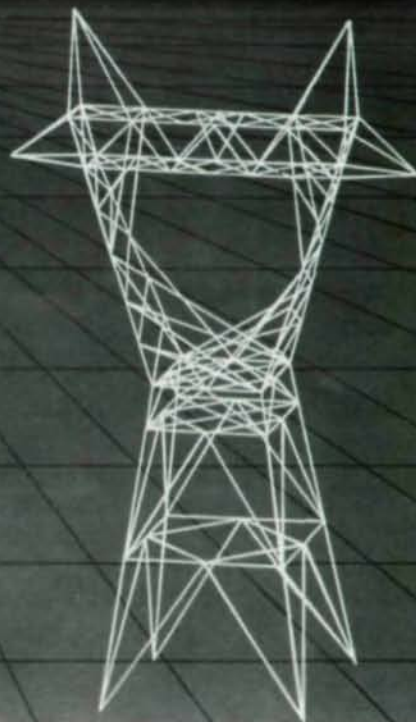
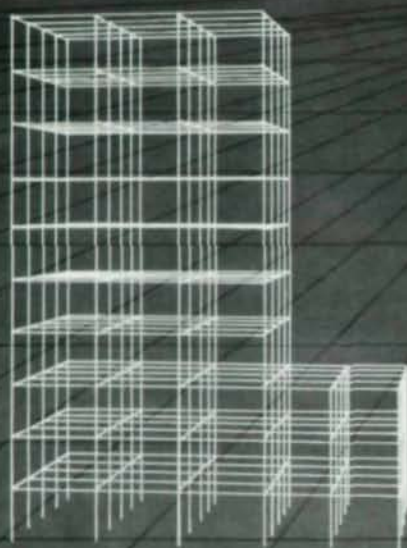
Hammerts Iron Works, Inc.
St. Louis, Missouri

Owner

Paramount Group, Inc.
New York, New York

Alan Elfanbaum is the project principal for Siebold, Sydow & Elfanbaum, Structural Engineers, St. Louis, Missouri.

MODERN STEEL CONSTRUCTION



STAAD-III/ISDS - Ranks #1 in America.

A recent ENR/McGraw Hill survey of the Architectural/ Engineering/ Construction industry has ranked STAAD-III/ISDS, from Research Engineers, as the #1 structural engineering software in the market today.

The choice of engineers since 1978, STAAD-III/ISDS is being used worldwide as an everyday companion in the design office. The first truly integrated structural engineering software, STAAD-III/ISDS combines geometric layout, analysis, design and drafting in a single software system.



Simple to use, yet sophisticated in application, STAAD-III/ISDS offers the most comprehensive solution to your structural engineering needs. Today, Research Engineers, with six offices in four continents, is setting the structural engineering standard worldwide.

STAAD-III/ISDS - #1 For a Reason.



*Research
Engineers, Inc.*

A reputation you can build on.

303 Pavilions at Greentree, Marlton, NJ 08053
Phone: 609-983-5050 Fax: 609-983-3825, Tlx: 4994385

In Europe: 19 Lansdowne Court,
Brighton Road, Purley CR2 3BD, UK

Join us for the 3rd Annual STAAD-III/ISDS
seminar December 14-16
at Bally's Casino Resort, Las Vegas.

Kansas City Site for 1990 "All-steel" Show

The 1990 National Steel Construction Conference, the only "all-steel" conference and trade show produced in the U.S., will be held in Kansas City, Mo., March 14-17. Last year's record attendance in Nashville included more than 1,000 fabricators, erectors, consulting engineers, architects, educators and suppliers.

"Heartland of America"

Located in both the geographic and population center of the nation (more than one-third of the U.S. population resides within 600 miles, and more than 55 million people within a day's drive), Kansas City describes itself as the "Heartland of America." Electric and eclectic, casual yet energetic, the city's character features some of the best characteristics of east and west, north and south—a virtual microcosm of Americana. A sophisticated metropolis, it still retains a small-town friendliness.

The city, which spreads out over gently rolling hills and steep bluffs, is an exemplary model of urban planning. Nearly 140 miles of gracious, tree-lined and fountain-studded boulevards wind through neighborhoods and parks.

The arts thrive in Kansas City. Lyric Opera is in its 29th season, the Kansas City Symphony performs regularly from late fall to spring, and the city's jazz legacy is evident in the city's night life. Both the State Ballet of Missouri and the Westport Ballet delight audiences each season. Touring Broadway musicals and locally produced theatre, including children's and dinner theatre, offer another dimension to live entertainment.

Kansas City's museums house everything from the prehistoric to the future: an archeology museum dating back to 200 B.C.; memorabilia of early pioneer life, regional history and the Civil War; collections of miniatures, horse-drawn vehicles and vintage cars; artifacts of black and Hispanic culture. The Nelson-Atkins Museum of Fine Arts is one of the most comprehensive art museums in the country.

Two religious denominations are headquartered in Kansas City. Nearby, Independence is home to the Harry S Truman Library and Museum; Weston has over 100 pre-Civil War (and lived-in) homes listed on the National Register of Historic Places.

Conference Headquarters

The Kansas City Convention Center in downtown Kansas City, Mo. is headquarters for the 1990 Conference. The Center has the space, convenience and flexibility to rate it as one of the top convention sites in the country. Bartle Hall, which will be utilized for the 1990 National Steel Construction Conference exhibits, has 14 loading docks providing direct access to the unobstructed (column-free) exhibit floor. Utility boxes located on 30-ft centers include lines for electrical, water, gas, air and telephone. A floor load of 300 psf live load enables display of even the heaviest equipment. There is ample covered parking for exhibitors and conference attendees (1-day parking only \$4). There is also underground access to the Allis Plaza Hotel (conference headquarters hotel), as well as to two of the supplemental hotels: Embassy on the Park and Radisson Suites. A fourth hotel, the Americana, is just one-half block away.

Kansas City International Airport, less than 15 miles northwest of downtown, is served by all major airlines.

Seminars and Technical Program

The 1990 National Steel Construction Conference combines, for the fourth consecutive year, the AISC National Engineering Conference and AISC Conference of Operating Personnel. Special sessions focus on the specific interests of structural steel fabricators, consulting engineers, architects, owners, public officials, erectors, detailers, researchers and educators.

The Conference continues to be the premier meeting place for engineering professionals, the best place to obtain the most information about buildings and bridges designed and built in steel.

Workshop sessions get down to basics, the nuts-and-bolts details of designing, fabricating and erecting structural steel. Every aspect of the construction process from concept to competition receives attention: computerized design, Load and Resistance Factor Design, Autostress Design, project management, shop and field inspection and safety, quality certification, productivity, welding, bolting, cleaning, painting.

The focus is on practical solutions to common problems, and it has also been the first forum for introducing the latest research on structural steel design, recent code changes and technological advances.

Exhibit Booth Space Available

The National Steel Construction Conference offers an ideal marketplace to those who provide products and services to the structural steel industry. In addition to display booths, exhibitors at the 1990 National Steel Construction Conference will also be given an opportunity to conduct a Product/Service Workshop. Introduced for the first time last year, these special sessions offer a forum where companies can share the latest technological advances in specialized fields, conduct demonstrations or question-and-answer dialogues, introduce new or updated equipment and programs. These workshops will be conducted during specific time periods, not in conflict with regular conference sessions, and the schedule will be included as part of the Official Conference Program. Information on exhibit space at the conference is now available from AISC headquarters (312-670-2400).

Pre-Conference Events

This year's Schedule of Events will include an Educator Meeting, concentrating on subjects of interest to those who teach structural steel design courses at colleges and universities; and a Professional Member Forum for structural engineers interested in current programs and publications available from AISC. Other organizations or associations who would like to schedule pre-conference activities to take advantage of this expected high concentration of industry representatives should contact Lona Babbington, Conference Coordinator, at 312-670-5432.

Spouses' Program/Optional Events

In addition to the technical program, the conference will also include a special program for spouses and guests of those registering to attend. A schedule of planned evening and post-conference activities will also be offered.

MSC to Publish Special Show Issue

Modern Steel Construction will publish its January/February issue as The 1990 National Steel Construction Conference Official Program issue. It will also expand circulation for the November/December issue to offer information (including Official Program and Registration Form) to the widest possible audience.

The Pattis Group-3M, Lincolnwood, Ill. is MSC's advertising representative. Eric Neiman (312/679-1100) will be happy to give you full details on advertising in this special issue. □

1990 National Steel Construction Conference

Schedule of Events—Preliminary

Monday and Tuesday, March 12, 13

Exhibitor Move-in

Pre-conference Events to be announced

Wednesday, March 14

- 8:00 - 5:00 p.m. - Educator Session
- Noon - 5:00 p.m. - Professional Member Forum
- 8:00 - 5:00 p.m. - Committee meetings
- 9:30 - 12:00 a.m. - **Optional Event: Tour of Kansas City**
- Noon - 1:00 p.m. - Partners in Education Luncheon
- Noon - 1:00 p.m. - Speaker Luncheon
- 1:30 - 3:00 p.m. - General Session: "Construction Claims"
- 3:00 - 5:00 p.m. - Exhibits open
- 5:15 - 6:00 p.m. - Exhibitor workshops
- 6:30 - 7:30 p.m. - AISC Welcome Cocktail Party - Exhibit Hall

Thursday, March 15

- 7:00 - 8:00 a.m. - SASF Educator Breakfast
- 7:00 - 8:00 a.m. - VCSSF Educator Breakfast
- 7:00 - 8:00 a.m. - Speaker Breakfast
- 7:30 - 8:15 p.m. - Exhibitor Workshops
- 8:30 - 10:00 a.m. - General Session
- 10:00 - 3:00 p.m. - Exhibits open
- 10:00 - 10:45 a.m. - Coffee break (Exhibit Hall)
- 10:45 - 12:15 p.m. - Technical seminars
- 11:45 - 12:15 p.m. - Lunch service open
- Noon - 1:30 p.m. - **Spouses' Event (Lunch & Program)**
- 12:15 - 2:30 p.m. - Lunch/Exhibit Session
- 3:00 Exhibits close
- 1:45 - 5:00 p.m. - **Spouses' Event**
- 2:30 - 4:00 p.m. - Technical seminars
- 4:10 - 5:25 p.m. - Technical seminars
- 5:30 - 6:15 p.m. - Exhibitor workshops (45 min.)
- 7:00 - 7:45 p.m. - Reception (cash bar) - Allis Plaza Mezzanine
- 7:45 - 9:30 p.m. - **Optional Event: Conference Dinner and Entertainment - Allis Plaza Hotel - Count Basie Ballroom**

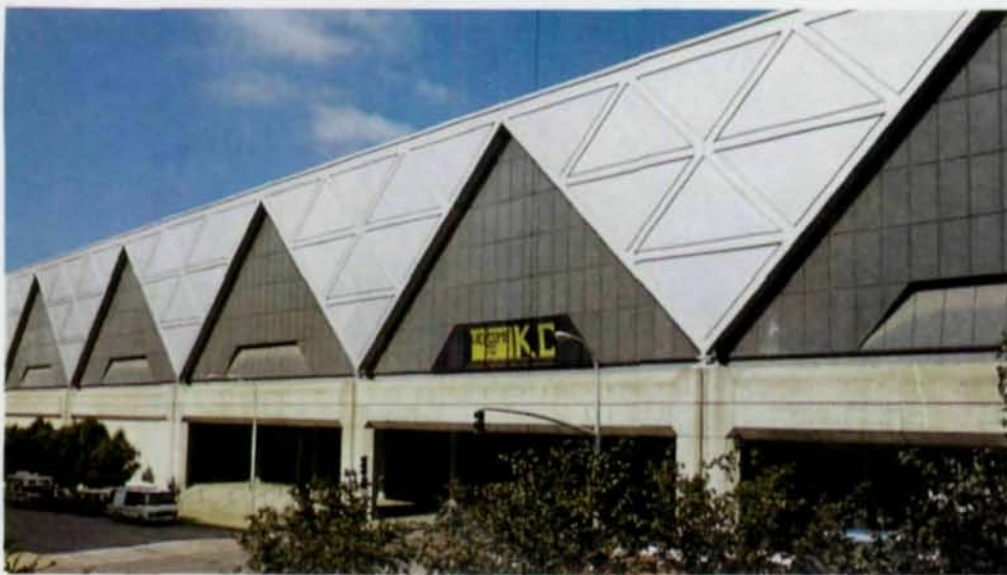
Friday, March 16

- 7:00 - 8:00 a.m. - Speaker Breakfast
- 7:30 - 8:15 a.m. - Exhibitor workshops
- 8:30 - 10:00 a.m. - Technical seminars
- 9:00 - 12:00 p.m. - **Spouses' Event**
- 10:00 - 10:45 a.m. - Coffee break
- 10:00 - 2:30 p.m. - Exhibits open
- 10:45 - 12:15 p.m. - Technical seminars
- 11:45 a.m. Lunch service begins
- 12:45 - 5:00 p.m. - **Spouses' Event**
- 12:15 - 3:00 p.m. - Lunch/exhibits open
- 3:15 Exhibits close, Exhibitor Moveout begins
- 3:00 - 3:45 p.m. - General Session: T. R. Higgins Lecture
- 4:00 - 5:30 p.m. - Technical seminars
- 6:30 - 6:45 p.m. - **Optional Event: Dinner Theatre**

Saturday

- 8:30 - 9:30 a.m. - General Session, "Block 111" (Kansas City 34-story steel-framed high-rise building)
- 9:30 - 12:00 Noon Choice of:
Hard-hat tour of Block 111
Tour of local fabricating plant
Hard-hat bridge tour
- 2:00 - 5:00 - **Optional Event: Trip to Independence/ Truman Library**

Note: The Conference Program, accompanied by Registration and Hotel Reservation forms, will be published in its entirety in the November/December issue of Modern Steel Construction. Copies will also be mailed in advance of that publication to more than 15,000 potential attendees who have requested information on, or regularly participate in, AISC's educational activities.



H. Roe Bartle Hall, Kansas City, Mo. Its 186,300 sq. ft of unobstructed steel-framed space provides generous room for convention and exhibit needs.

Use Our High Strength Wide Flange Beams And Put Less Money In The Bank.

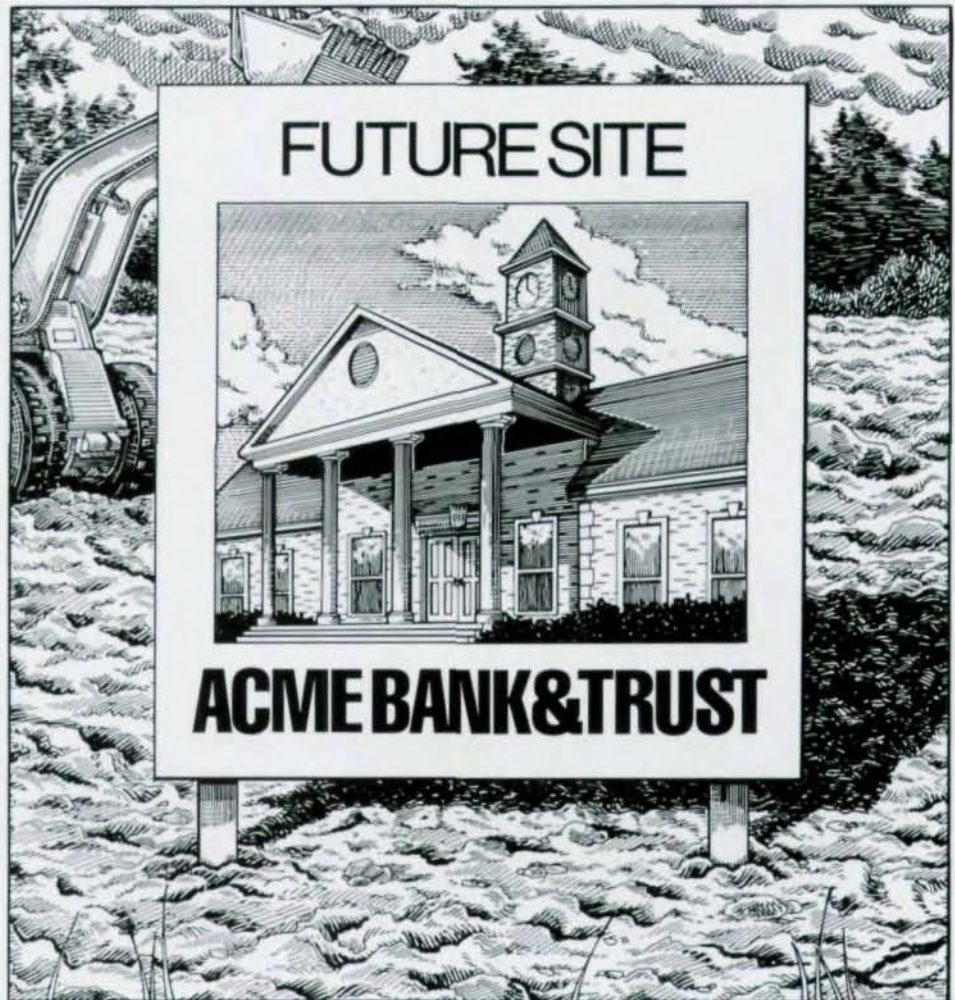
Now you can buy high strength wide flange beams for only ten dollars a ton more than standard A36 beams. And that means you can save a ton of money on steel and construction costs. Because, as you know, with high strength beams (50,000 psi) you can use lighter weight sections than with regular steel beams (36,000 psi). Matter of fact, the overall frame weight can be reduced by 20-25% and still carry the required loads. That means less steel is needed, foundations can be smaller and column sizes can be reduced.

We can offer this steel at such a low price because we produce in modern, efficient electric arc furnaces. And that enables us to keep alloying costs to a minimum. And the savings are passed on down the line.

So if you're building a bank or any other building, you'll be putting less money into it. And that should make everyone involved very happy.

Our high strength wide flange beams are available in ASTM A572 Grade 50 and CSA 40.21 Grade 44W. They range from 6" to 24" in depth and up to 120 pounds per foot. So contact Nucor-Yamato for details. Call 800/289-6977 or write to Post Office Box 1228, Blytheville, Arkansas 72316. And start putting less money in the bank, or any other building you build.

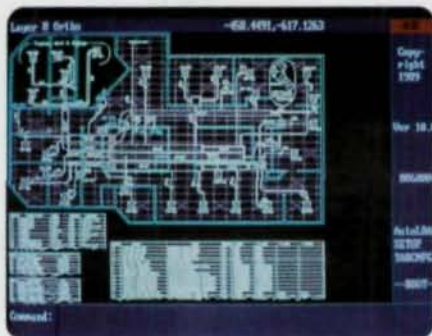
Nucor-Yamato Steel Company



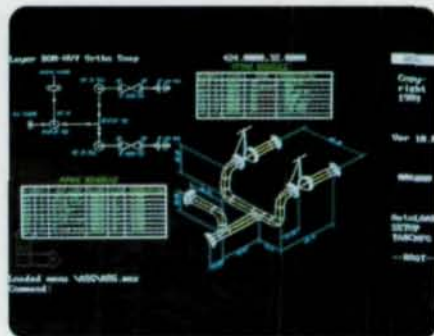
The First Fully Integrated CAD Solution Should Look Familiar.



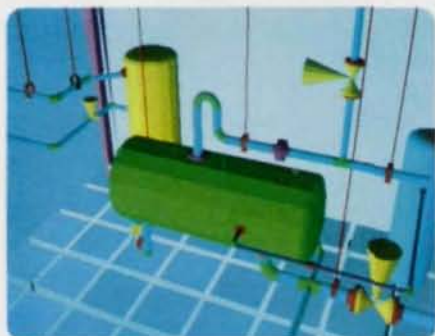
The look and feel of the familiar industry-leading AutoCAD AEC[®] Architectural.



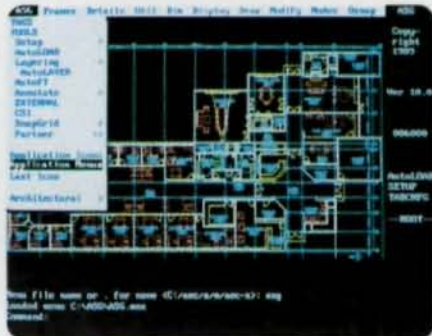
The best-selling, two-template ASG Mechanical will replace AutoCAD AEC[®] Mechanical.



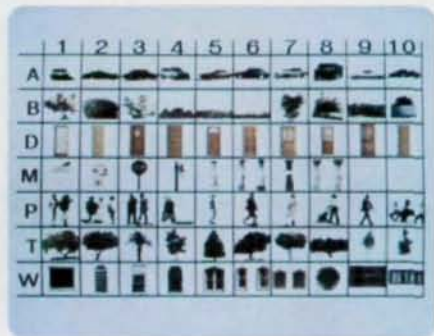
ASG 2-D Piping, creates plan and isometric views in single or double line.



ASG 3-D Piping harnesses the 3-D power of AutoCAD Release 10.



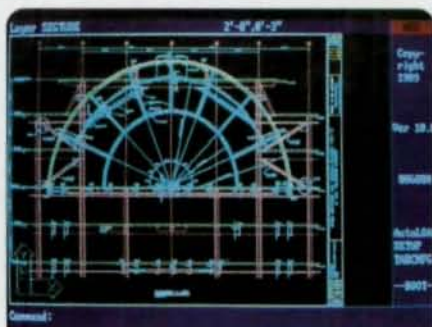
ASG Core is a unique "operating system" of integrated tools and utilities.



ASG Image Library for enhancing drawings, presentations, and renderings.



Standard, shared "look and feel" to all ASG templates, screen menus, pull-downs and icons.



The state-of-the-art ASG Structural.



The ASG Video Trainer Series, a self-paced productivity-building tool.

The products in ASG's integrated CAD solution are familiar because you know many of them already. As the best-selling, industry-leading, award-winning products of Archsoft and Chase Systems.

The companies with the largest installed user and dealer base in the AutoCAD third-party development industry. Archsoft and Chase Systems

have come together as ASG with one purpose in mind. To bring you the industry's first genuinely integrated product line. A line with a *standard user interface*



ASG
THE INTEGRATED CAD SOLUTION™

across all of it. And backed with comprehensive training tapes, a video library, and a strong customer service program.

Now configured with a shared interface, all existing Archsoft and Chase Systems products will be released under the ASG name, starting this month. And they'll be joined shortly by a growing line of additional, productivity-building CAD products from ASG.

BELLEVUE BAPTIST CHURCH WASN'T BUILT ON FAITH ALONE!

After all, building a church big enough to seat 7,000 people took extraordinary planning. Plus it took finding the right system to span huge spaces. The answer was Vulcraft's super long span steel joists. According to the structural engineer, these were a far better solution than using specially fabricated trusses since our joists saved weeks of engineering design time, months of fabrication time and the cost of a second crane during erection. Furthermore, the joists saved the church more than \$150,000 compared to the cost of trusses.



05300

At 209' long and 9'4" deep, the joists are the largest that we or, we believe, anyone else in the country has ever made. At such a size, they had to be made in two pieces, trucked to the site and then bolted together — a process the erector found easy to complete.

And even though they were gigantic, the joists were easy to erect. Because, as the structural engineer commented, "With Vulcraft, you know what you'll get and you know the joists will fit."

We not only provided super long span joists for the job but steel deck, too. And we faithfully delivered all materials on schedule. Now we hope you'll find out how we can help with your construction projects. Just contact any of the plants listed below or see Sweet's 05100/VUL and 05300/VUL for more information. We'll make a believer out of you.

PO Box 637, Brigham City UT 84302 801/734-9433; *PO Box F-2, Florence, SC 29502 803/662-0381; PO Box 169, Fort Payne, AL 35967 205/845-2460; *PO Box 186, Grapeland, TX 75844 409/687-4665; *PO Box 59, Norfolk, NE 68701 402/644-8500; *PO Box 1000, St. Joe, IN 46785 219/337-5411. *Deck manufacturing locations. Architect: Aluah Breitweiser & Associates; Steel Fabricator: Central Steel; Steel Erector: Barnhart Crane & Rigging Co.; General Contractor and Structural Engineer: Commercial Builders of Kansas Inc.

VULCRAFT
A Division of Nucor Corporation



Both Vulcraft super long span joist and steel deck were used to build this gigantic church in Memphis, Tennessee.

Introducing the Software Solution for Structural Engineers and Detailing Professionals

The most complete integrated software programs available for producing engineering plans, details and fabrication drawings

AutoPE Structural

- Comprehensive industry specified material libraries
- Powerful applications programs for:
 - framing plans • foundation plans • structural concrete plans • tilt-up panels • elevations, sections & details • 3D wire frame diagrams
 - full engineering construction plans
- Render ready models
- Bi-directional Analysis/Design interface
- Demonstration videos and demo disk are now available.

Structural Detailer

Provides a complete detailing environment for producing finished shop fabrication drawings, erection drawings and bolt setting plans, giving you complete control over drawing construction and appearance.

- Interactive graphic drawing and editing
- parametric programs for detailing all types of steel shapes and connections including:
 - beams • columns • bracing • erection drawings • anchor bolt plans • field bolt generator • dynamic dimensioning
- Ability to create specialized and custom details
- Computerized catalogues of AISC, CISC, BS4 and DIN steel components
- Bill of material weights calculated automatically
- Intelligent detail member manager

D.C.A. Structural is used inside AutoCAD®

AutoCAD® is a registered trademark of Autodesk, Inc.



D.C.A. Engineering Software

Unifying the AEC World with a Single Source for Solutions

P.O. Box 955, Henniker, NH 03242 (603)428-3199 FAX (603)428-7901

LRFD—Alive and Well

AEGIS PRE-COMMISSIONING UNIT

Training for the Real Thing!

by David K. Pinkham

As part of their contract for the Aegis shipbuilding program, Bath Iron Works, Bath, Maine, is required to provide office space for "nucleus" U.S. Navy crews who are assigned to a new ship from the time shipbuilding gets underway. The recently completed Precommissioning Building was designed in response to this requirement. Each of its three decks houses offices, classrooms and support spaces which permit Navy personnel to train for and practice the administrative functions required when the crew actually goes to sea in their new vessel. In the new building, each 13,000 sq. ft "deck" is a dry-land "ship," which permits simulation of the activities, if not the environment, of the real thing.

An overall nautical tone is established at the front door, where a lighted showcase greets the visitor with a display of ship models. A flying staircase in the front entry rotunda connects three quarterdecks where visitors are "piped aboard." And each deck sports its own ship's store, barbershop, ship's supply and other functions.

The exterior treatment of the new facility is intended to respond subtly to the maritime influence of the area. Bath has a long and honored history as a shipbuilding city, reflected in many of its most prominent structures. As a result, all of the new building's neighbors are traditional in styling. Even recent additions to this part of the BIW complex are colonial adaptations, brick being the favored material for larger structures.





Exterior of new facility designed to fit maritime feel of area. LRFD design proved cost-effective.

These factors led the architect to opt for a continuation of the red-brick vocabulary of nearby structures and to design the building in a quietly post-modern style which echoes its neighbors. The use of oversized white columns, white precast concrete belt courses and multiple pane

windows, plus bright red doors in traditionally styled entrances, lends visual sparkle to the building.

The structural engineer selected a structural steel/steel joist framing system since it is used commonly in the area and has proven to be cost-effective. Local

contractors, erectors and fabricators are familiar with the system, and it is easily erected. Since the project is straightforward and is typical of steel systems used in this area, the structural engineer chose to use Load and Resistance Factor Design (LRFD) methods rather than the Allowable Stress Design (ASD). This presented an opportunity to use LRFD on an actual project and compare the results to ASD.

To accommodate the initial floor plan required by the Navy, column spacings range from 25 ft to 26 ft-8 in. in the north-south direction and 17 ft-2 in. to 22 ft in the east-west direction. Floors are 3 in. concrete slab on metal form deck supported by steel joists spanning in the north-south direction. The roof is 1½-in. deep wide-rib steel deck on steel joists spanning north-south. The structural system is braced in both directions using K-braces to permit door location in interior walls.

An 80-psf floor live load was used to allow unrestricted corridor locations in the future. Live-load reductions allowed by the 1987 BOCA Code were used for beams

JOBBER II

FEET-INCH-SIXTEENTHS ENGINEERING CALCULATOR WITH DECIMAL & METRIC

"The calculator that does it all"

It will save you time, money & costly mistakes.

If You Work With Dimensions—You Need

CALCULATOR THAT WORKS IN DIMENSIONS (FEET, INCHES & SIXTEENTHS)

- USED BY THOUSANDS OF DETAILERS AND FABRICATING SHOPS.
- EVEN YOUR FOREMEN, CREWLEADERS AND LAYOUT MEN WILL FIND IT TO BE ONE OF THE HANDIEST TOOLS THEY EVER HAD.
- ERRORS OR MATH PROBLEMS CAN BE SOLVED IMMEDIATELY, INCLUDING TRIANGLES AND TRIG SOLUTIONS.
- It is the Best and Simplest to use of All Feet-Inch-Sixteenths Calculators.
- It is programmed to solve right triangles giving you the Bevel-Slope-Rise-Run at just the touch of a button.
- Jobber II has the only patented 0-15 keyboard in the industry.
- ALMOST ANYONE CAN BE A MATHEMATICAL GENIUS.



ACTUAL SIZE: 3¼" x 5½" x ¾"

**\$89.95 Plus \$3.00 Postage & Handling
MONEY BACK GUARANTEE**

For more information or to order, call toll free 1-800-635-1339.

JOBBER INSTRUMENTS CO.
P.O. BOX 4112
SEVIERVILLE, TN 37864

TN CUSTOMERS CALL (615) 428-6517

and columns. Floor dead load was 46 psf, which includes a 5-psf allowance for mechanical and electrical systems. The live-to-dead-load ratio for floors was about 1.75 before live-load reductions were taken. To simplify design, live-load reductions were based on the smallest tributary area for floor beams which allowed a 24% reduction in live load. After reduction, live-to-dead-load ratio was 1.3.

The roof system was designed for a 42-psf snow load and a 30-psf dead load, which included a 5 psf allowance for mechanical and electrical systems. Live-to-dead-load ratio was 1.4.

As expected, some savings in steel weight were realized by using LRFD. The greatest savings in weight over ASD members were in the interior floor beams. Typical spans were 17 ft-2 in., 20 ft and 22 ft. The total designed weight for these beams was 30,200 lbs. For the 20- and 22-ft spans, beam sizes were about 4 to 6 lbs. per foot lighter than ASD sizes. Using the smallest sections allowed by LRFD, total weight savings over ASD was about 3,100 pounds, or approximately 10%. No savings were realized for spandrel floor

beams, roof beams and columns. The column spacings required by the floor plan were smaller than spacings preferred for economy. Had some bay spacings been slightly greater, LRFD would have resulted in the next lower size for some of these beams and for columns.

A 10% savings in steel weight when using LRFD vs. ASD seems a reasonable expectation, at least for more heavily loaded interior members. Note that the savings in this case were realized in a braced-frame structure with non-composite beams subject to common design loads. Other structure types such as industrial facilities with

large design live loads will demonstrate more benefit from LRFD.

No significant difficulties were encountered using LRFD rather than ASD for design. The expected "learning curve" was encountered, but was not severe, though calculation bookkeeping was slightly more involved. Loads must be tracked in their various forms, such as unfactored loads (deflections and foundation sizing), LRFD factored loads (steel design) and ACI factored loads (foundation design). For straightforward member loading, composite load factors and ratios can simplify this task. *(continued)*



A flying staircase to each "deck", which simulates division of administration ship-board, permits naval personnel to train for new duties in familiar environment.

800-331-3002

Custom squares and shapes. Order squares from 12" to 24". Rectangles from 4" X 20" to 24" X 30".

Single lengths from 5' to 40', spliced lengths to 60'. A500 dimensions.

No minimum quantity. Material grades ASTM A36 to A572-50. Contact John Holden.

FREE CATALOG



**VALMONT
TULSA**

The structural engineer has used LRFD on several projects subsequent to the B.I.W. building, including a school, industrial facilities and other commercial projects. The most obvious advantage in using LRFD vs. ASD is the weight savings which can be realized. A less obvious benefit is the reduction in member depth that often accompanies the reduction in weight. This has been a real benefit on projects where beam depths are restricted. LRFD permits a smaller beam size and greater design flexibility for the architect—with no weight penalty. □

Architect

William J. Bisson Architect
Falmouth, Maine

Structural Engineer

Pinkham and Greer Consulting Engineers, Inc.
Falmouth, Maine

General Contractor

Allied Construction
Portland, Maine

Owner

Hamblet Development Corp.
Portland, Maine

David K. Pinkham, P.E., is a principal in the consulting engineering firm of Pinkham and Greer, Falmouth, Maine.

METAL DECKS STEEL JOISTS TRUSS GIRDERS

For over 35 years, Riopelle has been providing customers with high quality, S.I.I. Specification steel bar joists, ASCE Standard metal decks.

- **Fast Estimates: Fax us your lists or send us your plans**
- **Quick In-House Detailing**
- **Delivery When You Want It**
- **Structural Engineering**

We serve all fabricators and structural engineers. Our large volume assures both fast delivery and highly-competitive quotes. No job is too big or too small. International shipments available.

For unbeatable prices and favorable credit terms, give us a call today.



RIOPELLE
ENGINEERING SALES, INC.

8817 West Lynx Avenue
Milwaukee, Wisconsin 53225-1833
U.S.A.

Call collect: 414-353-8080
Jim VanDien • Dan Zane • Bill Saar
FAX: 414-353-8093

Steel Notes

HONORING BOGARDUS

Building professionals familiar with the relation of cast-iron architecture to the tectonics of modern steel structures, will be pleased to learn that James Bogardus (1800-1874), "the inventor in iron" who correctly claimed credit for being designer and builder of "the first complete cast-iron edifice in America, or in the world . . ." at long last was honored by the City of New York. On April 14, 1989, Mayor Edward Koch affixed a plaque with his name on a small parcel of city property (with six trees!) located in the lower Manhattan area called TriBeCa.

At age 14, Bogardus began his working career as watchmaker and eventually as a civil engineer adept at inventiveness related to a multitude of cast-iron fabrication and construction methods, as well as to precision instruments. Patents awarded to him included inventions for "Construction of the Frame, Roof and Floor of Iron Buildings," and for engraving and die-cutting machines, a pyrometer, a deep-sea sounding device, a chronometer and a glass pressing machine. Along with his contributions to cast-iron construction, he anticipated skyscrapers by designing and building about four iron-frame, fire-watch towers and shot towers ranging in height from 175 to 200 ft; they have been described as "the first true skeleton structures in the modern world."

At this point, we must confess that no building professional had initiated this belated gesture of respect; the promoter of the idea was the well-known Margot Gayle, respected and beloved by the many supporters of our culture, including a great number of architects. Mrs. Gayle is a writer of four books, many articles and a newspaper column, a lecturer and civic activist. As a "tireless advocate of historic preservation and urban amenities," she has been involved closely with a large group of civic-interest organizations, including the *Victorian Society of America* of which she was a founder and the *Friends of Cast-Iron Architecture*, of which she is both founder and President.

ARCHITECTS/ENGINEERS BEWARE: A CHANGE MAY BE COMING

The present law in most states, holds that architects or engineers may be legally responsible for faulty designs or services only if they are negligent. Negligence in this sense is the failure of the architect or engineer to exercise that degree of care or skill customarily exercised by prudent architects/engineers under the same or similar circumstances.

Thus, in a case where an architect is

accused of negligence, the typical instruction given to the jury, or the law which would be followed by a judge in a non-jury trial, would be:

It is the duty of an architect in his work to employ that degree of knowledge, skill and judgment ordinarily possessed by members of that profession, and to perform faithfully and diligently any service undertaken as an architect in the manner a reasonably careful architect would do under the same or similar circumstances.

The failure to perform such duty constitutes negligence. *Colorado Jury Instructions (Civil) 2d 15:18 (1980)*

It is apparent from the quoted instruction that perfect results are not required of the architect/engineer under the negligence rule. Instead, he must only conform to the standard of care exercised by his peers under the same or similar circumstances.

Signs of Change Loom

However, signs of change loom on the horizon. In a recent Kansas case, the supreme court of that state ruled that the law of warranty would apply to an architect. The court held the architect impliedly warrants his services will achieve the result

(continued)

**STEEL
DETAILING**

with **AutoCAD®** 

**BEAMS & COLUMNS
PLANS & ELEVATIONS**

Versatile and cost effective programs for detailing structural steel and miscellaneous metal

Together only \$5500.00

Beams & Columns with Plans & Elevations also can be used with other, more costly, programs to finish what they can't do.

**call now !
for more information**

Developed by Detailers for Detailers

COMPUTER DETAILING CORP.
1310 Industrial Blvd.
Southampton, Pa. 18966
215-355-6003

**1989-90
EDITION**
Just Published!



**NEW
and
UP-DATED**

**EXPANDED
TO INCLUDE
SPECIFICATIONS
AND COMMENTARY FOR
CELLULAR METAL
FLOOR DECK WITH ELECTRICAL DISTRIBUTION.**

**Steel Deck Institute,
Design Manual**
For Composite Decks,
Form Decks, Roof Decks,
and Cellular Metal
Floor Deck with
Electrical Distribution

For 50 years the Steel Deck Institute has provided uniform industry standards for the engineering, design, manufacture, and field usage of steel decks.
NOW AVAILABLE—ORDER YOURS TODAY!

PRICE
\$11⁰⁰

Send checks, postal, world moneyorder, drafts in U.S. currency.

QUANTITY

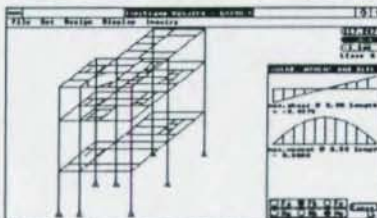
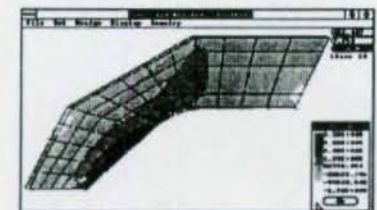
_____ **NEW AND UP-DATED Design Manual For Composite Decks, Form Decks, Roof Decks and Cellular Metal Floor Deck with Electrical Distribution**

US Currency Total _____
Out of USA surcharge, 15% _____
Add on for Airmail _____
TOTAL ENCLOSED _____

STEEL DECK INSTITUTE, INC.
P.O. Box 9506 Canton, Ohio 44711 (216) 493-7886

INERTIA®

Integrated Engineering System



- Graphical Modeling
- Finite Element Analysis & Design
- Heat Transfer (Thermal)
- Mechanical Analysis (Mechanism)
- Structural Design (AISC)
- Spring Design (ASME)
- Available on all PCs and Macs

MCAE, Inc.

Tel 1-800-444-6223 Fax 1-317-463-7166

Steel Notes (continued)

called for under his contract with his client. In its discussion, the court expressed the opinion that architecture and engineering are sciences, capable of precision—unlike the practice of law or medicine which involve inexact sciences.

In defense of the Kansas court, it is noted the complaint against the architect involved his alleged failure to properly inspect and check grading and drainage problems resulting from excessive dirt removal. Surely, the grades were scientifically determinable.

However, it may be argued that architecture and engineering are not always exact sciences. New materials, different applications, even changing atmospheric conditions appear to render architecture and engineering practices inexact in many aspects. If architects and engineers are forced to limit themselves to established methods, materials, etc., there will be little or no advancement into new and untried areas of design. One must wonder whether Buckminster Fuller would have conceived the geodesic domed structure if he would have been required legally to guarantee its performance.

Whether other states will follow the lead of the Kansas court in the case consid-

ered, *Tamarac Development Co., Inc., v. Delawater Freund & Associates, P.A.*, 234 Kan. 618, 675 P.2d 361 (1984), remains to be seen.

What is certain is that more and more owners will insist their courts adopt the warranty theories and that an equal number of architects or engineers will argue otherwise.

This *Brief's* practical suggestions are:

1. Architects and engineers be aware of the possible changes in the law.
2. The professions consider whether to state in their contracts that they make no warranties, express or implied, with respect to the quality or character of their work, and
3. Architects/engineers determine whether their professional liability insurance covers liability for breach of implied warranties. □

The author, Al Wolf, is a lawyer with over 20 years of experience in the many facets of construction law. He has lectured many years using his knowledge and experience to explain the litigation process, showing how the law and the reader may work together to obtain positive results.

If you would like a collection of Construction Law Briefs previously published in a fully indexed, convenient to use loose-leaf volume, contact Jacqueline Enterprises Publications, 1873 S. Bellaire, #800, Denver, Co. 80222, 303/779-8278.

TRAVELIFT®

best in the long haul!

When you make an investment in material handling equipment that your entire operation revolves around, you want that investment to be there, fully operational, whenever you need it. We call it being there for the long haul! MI-JACK TRAVELIFTS have been making the long haul for over 25 years. In industrial and construction applications throughout the world, TRAVELIFTS have improved production efficiencies as much as 400%; reduced manpower requirements by 50% and increased lift capacities in the bargain. TRAVELIFTS outlift other types of crane, with less crew, and transport their loads virtually anywhere in a production area or yard, WITHOUT FEAR OF TIPPING! If you think that's a tall statement, we'll be happy to demonstrate the efficiency and ability of the MI-JACK TRAVELIFT. We can arrange a demonstration on a similar application, or bring in a movie of the TRAVELIFT making the long haul.

20' TO 60' ICW
20' TO 40' HOOK HEIGHT
20' TO 50' WHEELBASE

MI-JACK PRODUCTS

3111 West 167th Street
Hazel Crest, IL 60429
1-312-596-5200
TELEX: 27-0177

1989 AISC Prize Bridge Awards

AWARD CATEGORIES

The 1989 Prize Bridge and Merit Award winners have been announced by the American Institute of Steel Construction. This year, 10 Prize Bridge winners and 11 Awards of Merit were announced, chosen as the most handsome and functional bridges opened to traffic between July 1, 1986 and June 30, 1989. Prize Bridges were selected in each of the 10 judging categories.

The Prize Bridge awards will be presented to the designers of the winning bridges at a dinner Thursday evening, Oct. 19, at The Shoreham Hotel, Washington, D.C., during the 1989 National Bridge Symposium on Steel Bridge Construction. Plaques adapted from the Joe Kinkel-designed sculpture, "The Long Reach," will be presented to winners. Designers of bridges chosen to receive Awards of Merit will be honored at local ceremonies later this year.

The Prize Bridge Competition, conducted since 1928, has inspired much greater attention to the aesthetics of bridge design as well as to the advancement of steel as a structural material.

And the winners are . . .

The Awards Jury

(left to right)

DIRK LOHAN
President & CEO
Lohan Associates
Chicago, Illinois

JOHN SMITH, JR.
State bridge design engineer
North Carolina DOT
Raleigh, North Carolina

DR. ARTHUR W. HEDGREN, JR.
Vice president
HDR-Richardson Gordon
Pittsburgh, Pennsylvania

ALBERT A. GRANT
Past president
ASCE
Potomac, Maryland

A Joe Kinkel sculpture on permanent display at AISC headquarters, "The Long Reach," is the motif for AAE and Prize Bridge awards presented by AISC. Winners receive bas relief plaques adapted from the sculpture.

Movable Span

Bridges with a movable span

Long Span

Bridges with one or more spans over 400 ft

Reconstructed

Bridges with major rebuilding/reconstruction to upgrade to current needs

Grade Separation

Bridges whose basic purpose is grade separation

Short Span

Bridges with no single span 125 ft long, or more

Special Purpose

Includes pedestrian, pipeline, airplane and others not otherwise identified

Railroad

Bridges (non-movable), primarily to carry a railroad, but may also be a combination railroad-highway bridge

Medium Span, Low Clearance

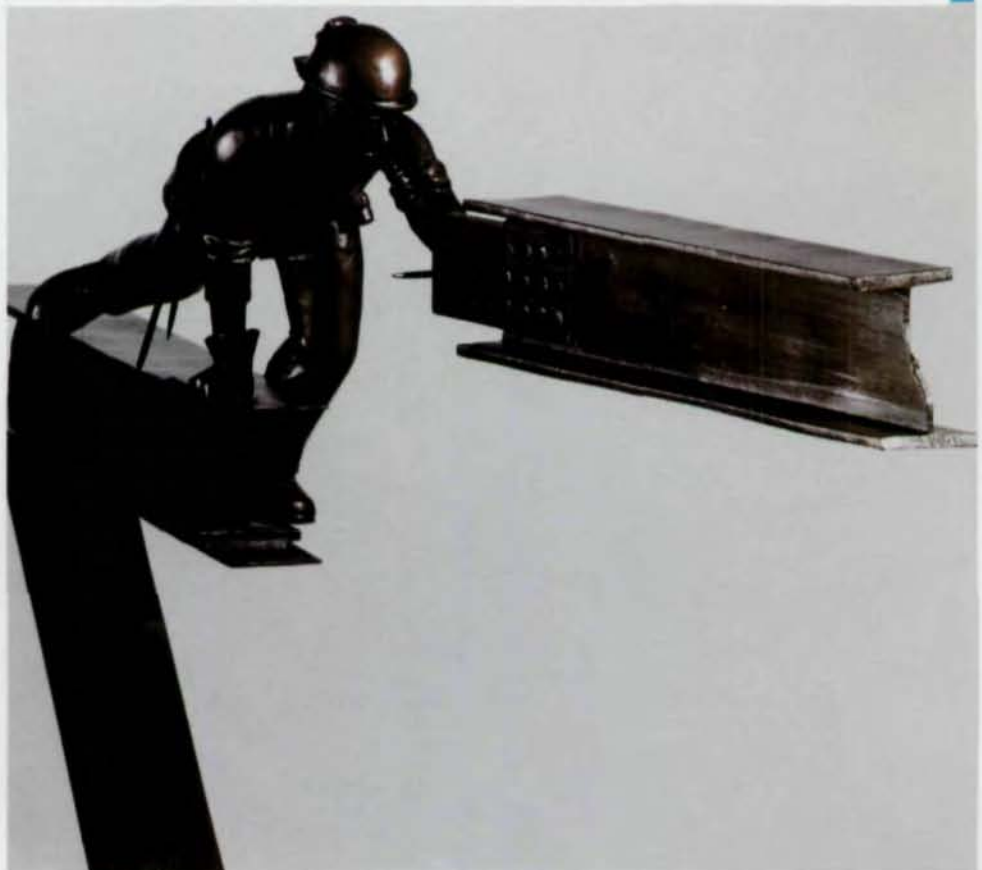
Bridges with vertical clearances of less than 35 ft, with longest span no more than 400 ft nor less than 125 ft

Medium Span, High Clearance

Bridges with vertical clearances of 35 ft or more, with longest span no more than 400 ft nor less than 125 ft long

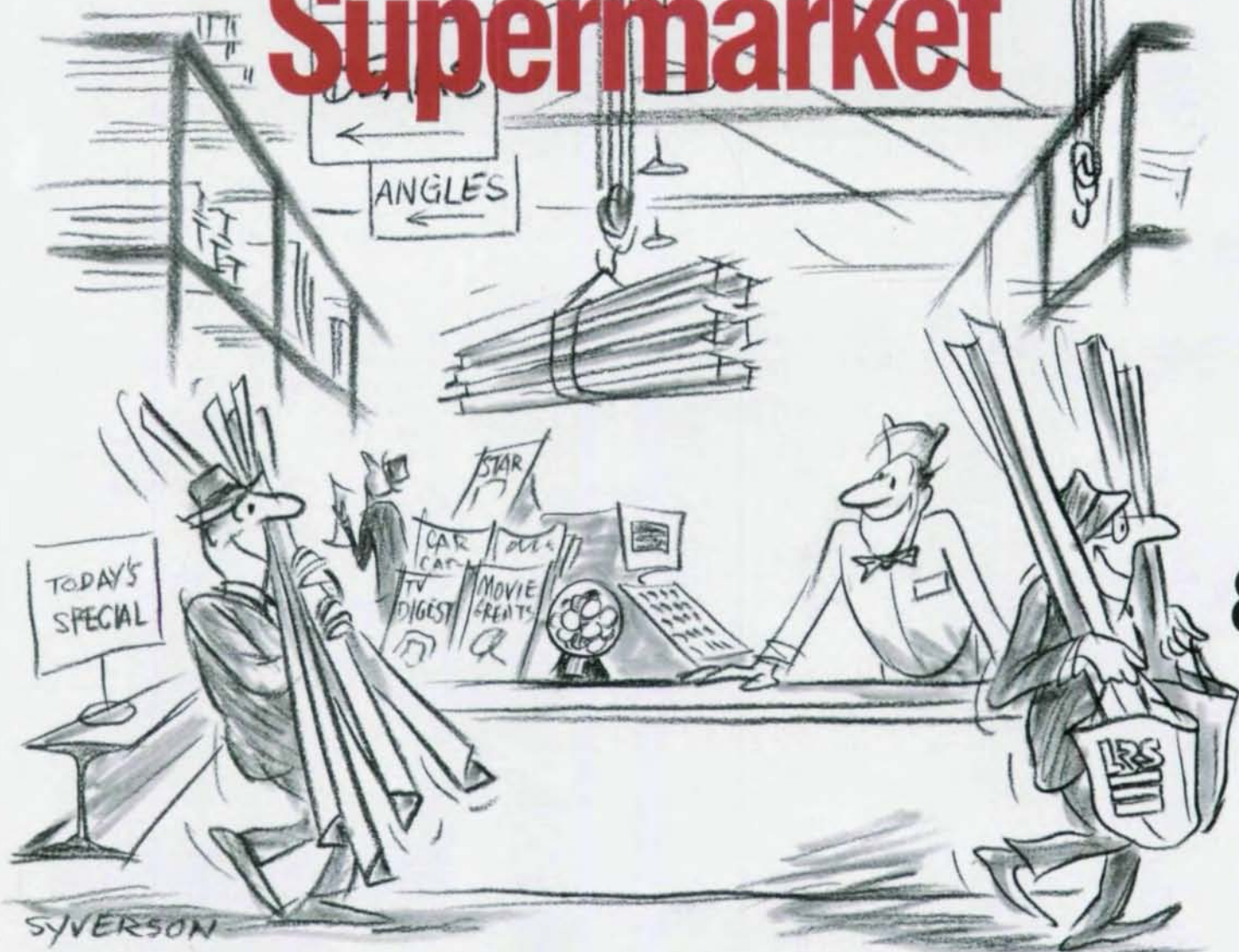
Elevated Highways/Viaducts

Bridges with more than five spans which cross one or more established traffic lanes, and may afford access for pedestrians or parking



AT LAST!

The Structural Steel Supermarket



At this moment there are about one million tons of brand-new structural steel in the United States.

You only want some of it. You should be able to get it without calling too many of the 162 million telephones in the U.S. It should always show up on schedule, and the price on the invoice should make it look like an invoice, not like a ransom note.

Levinson's vision is that steel buying should be as easy and economical as buying groceries—in every part of the country.

We're not there yet, but we're working on it. Right now, one call to Levinson gives you access to *everything* in structurals, plates, and bars. Delivery dates are firm—why quote any other kind?—and prices are competitive, because Levinson buys big.

In fact, we buy more structural steel each year than anyone else in America—which means we thoroughly understand the buyer's problems. So the next time you have a tall order, try the big store.

Free Book: For a look at the future of steel buying, request a copy

of *Strategies for Structural Steel*. Call or write: Dotti Bechtol, V.P. Adm., The Levinson Steel Company, P.O. Box 1617, Pittsburgh, PA 15230.

1-800-LEVINSON

LRS
LEVINSON
REGISTERED
STEELS

1989 Prize Bridge

LONG SPAN

QUINCY BAYVIEW BRIDGE

Quincy, Illinois



The component steel girder and concrete slab configuration of this 4,500-ft cable-stayed bridge is believed to be the first such application in the U.S. Other firsts: use of parallel, seven-wire strands for stay cables and use of epoxy strands (believed to be the first use in stay cables in the world). Framing includes longitudinal welded girders, transverse rolled-section floor beams and longitudinal roadway stringers. A computer, built into the bridge design, will monitor effects of wind, rain, traffic and motion of the river. Total cost was \$29 million, reportedly \$4 million less than a conventional truss-style bridge.

Structural Designer

Booker Associates, Inc.
St. Louis, Missouri

Consulting Firm

Modjeski and Masters
Mechanicsburg, Pennsylvania

General Contractor/Steel Erector

McCarthy
St. Louis, Missouri

Steel Fabricator

Stupp Bros. Bridge & Iron Co.
St. Louis, Missouri

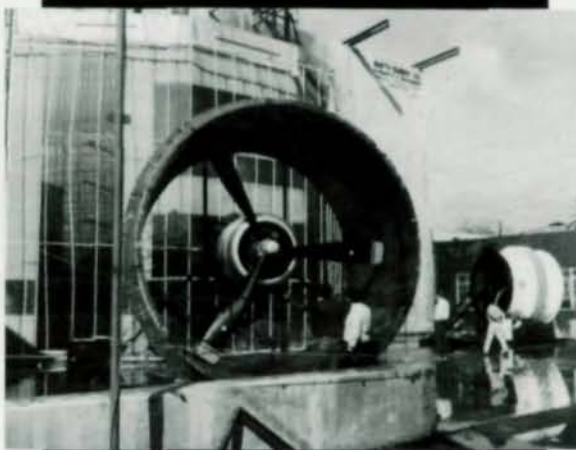
Owner

Illinois Department of Transportation
Springfield, Illinois

MSC ADVERTISERS

American Computers & Engineers	5
Archsoft Group	23
N.J. Bouras	2
CAST, Inc.	40
Computer Detailing	31
Computers & Structures	44
DCA Engineering	26
Design Data	48
Dogwood Industries	39
Enercalc Eng. Software	15
Epic Metals	47
Jancy Engineering	17
Jobber Instrument	28
LeJeune Bolt Co.	18
Levinson Steel	34
Lincoln Electric	7
Lukens Steel	13
MCAE	32
MJAC	32
Nucor-Yamato	22
Omnitech Associates	18
OTC America	38
Research Engineers	19
Riopelle	30
RISA	45
SAI	16
St. Louis Screw & Bolt	10
Smith-Emery Co.	35
Steel Deck Institute	31
Steelcad	6
Structural Software	3
J & M Turner	8
Valmont	29
Vulcraft	24, 25
W.A. Whitney	11

Window Wall/Curtain Wall Mockup Testing



- Testing Facility is 45-foot high by 70-foot long; 300 psf loading capacity.
- Per ASTM and AAMA Specifications.
- Computer aided data acquisition with instant deflection readings +/- .001 inch.
- Dynamic Tests using 2000 HP Aircraft Engine w/13.5 foot propeller.

Wilshire/Westwood, Los Angeles
Granite and Aluminum/Glass Window Wall Mockup ready for Dynamic Water Infiltration Test.

SMITH-EMERY COMPANY

The Full Service Independent Testing Laboratory, Established 1904
781 East Washington Blvd., Los Angeles, California 90021
213/749-3411 • Fax 213/746-7228

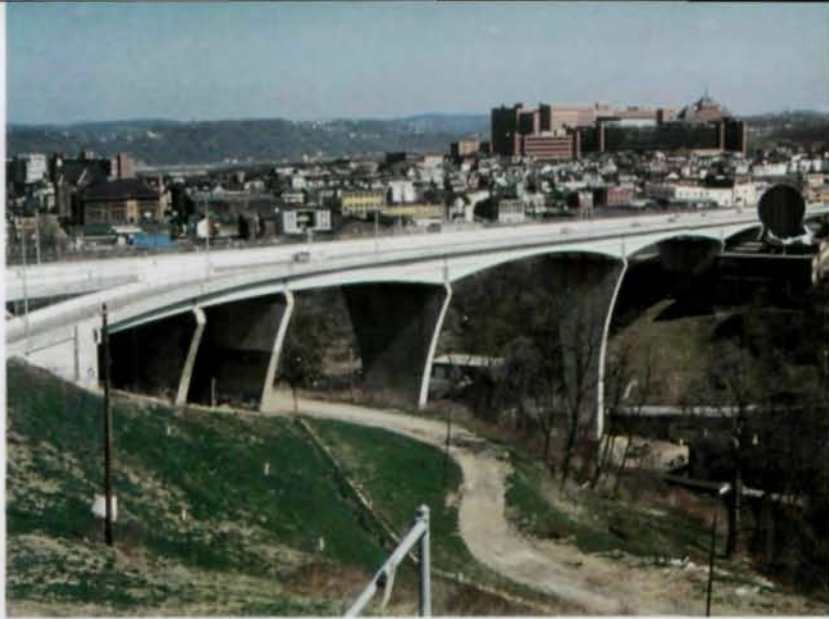


1989 Prize Bridge

MEDIUM SPAN, HIGH CLEARANCE BLOOMFIELD BRIDGE

Pittsburgh (Allegheny County), Pennsylvania

Linking two hillside communities by traversing a steep-sided valley, the design of this 9-span, 1,535-ft long bridge was the result of a conscious and continuing effort to adapt the high-level structure to the urban environment. Bridge design features include unusual tulip-shaped pier configuration, main girder spans comprising a four-span continuous, composite haunched girder system longitudinally fixed on the three main bridge piers via pot bearings, and main girder spans comprising five girders with sub-floor stringer framing system. An inspection walkway is provided between each girder line.



Structural Designer

Gannett Fleming Transportation Engineers, Inc.
Pittsburgh, Pennsylvania

General Contractor

Thomas A. Mekis & Sons, Inc.
Fenelon, Pennsylvania, and
Middle States Steel Construction Co.
Eighty-Four, Pennsylvania, and
Anjo Construction Company
Plum Boro, Pennsylvania

Steel Fabricator

Williamsport Fabricators, Inc.
Williamsport, Pennsylvania

Steel Erector

Middle States Steel Construction Co.
Eighty-Four, Pennsylvania

Owner

City of Pittsburgh
Department of Engineering & Construction
Pittsburgh, Pennsylvania

1989 Prize Bridge

SPECIAL PURPOSE

TRINITY CHURCH PEDESTRIAN BRIDGE

New York, New York

The Trinity Church Pedestrian Bridge connects the Gothic portico at the rear of the church with the second floor of a 25-story building across the street which houses parish offices and church and parish meeting rooms. The bridge design could not compromise the *historical integrity of the landmark church, nor could construction be permitted to interrupt heavy vehicular and pedestrian street traffic.* An architectural design came first: a lacey, graceful, flat-arched open metal structure patterned after the Loew Bridge at Saint Paul's Chapel built in 1866 and since dismantled. The structural design, a pair of Vierendeel-trussed deck arches, was shop-welded and fabricated in one piece and erected—in 90 minutes—as a unit. The final result appears so appropriate that "many regular passersby are not quite sure it hasn't always been there."



Structural Designer

Ammann & Whitney
New York, New York

Architectural Designer

Lee Harris Pomeroy Associates, Architects
New York, New York

General Contractor/Steel Erector

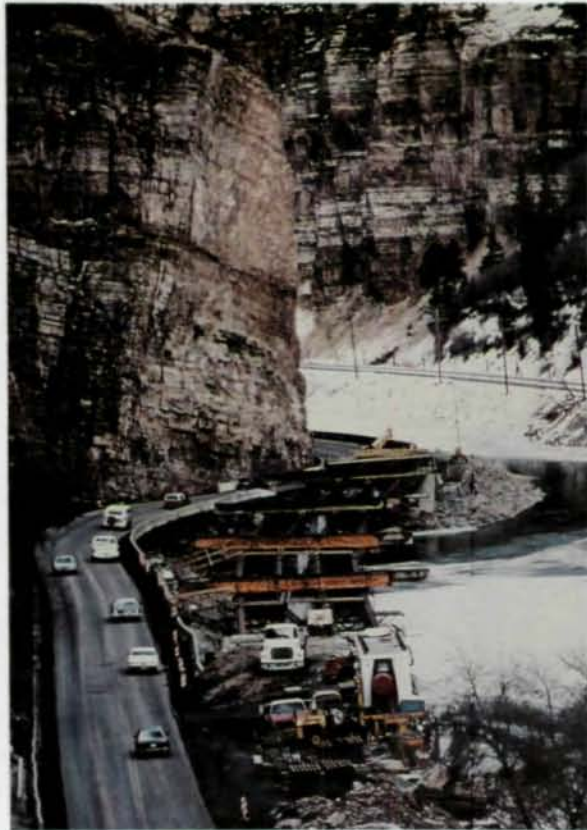
Nab Construction Corporation
College Point, New York

Steel Fabricator

Reynolds Manufacturing Company
Avonmore, Pennsylvania

Owner

Parish of Trinity Church
New York, New York



1989 Prize Bridge

MEDIUM SPAN, LOW CLEARANCE STRUCTURE 18E (REVERSE CURVE)

I-70 in Glenwood Canyon (Garfield County), Colorado

Difficult foundation conditions, constructability constraints requiring lightweight members and a very short construction season made steel the most economical answer for this scenic canyon structure. Four steel plate girders spanning 136 ft clear made erection easy and required less foundation, were easy to curve in following the alignment. Box steel pier caps, cantilevering over a very narrow shaft, were framed with the plate girders—rendering them invisible.

Structural Designer

Meheen Engineering Corporation
Denver, Colorado

General Contractor

Flatiron Structures Company
Longmont, Colorado

Steel Fabricator

Grand Junction Steel
Grand Junction, Colorado

Steel Erector

Grett Steel & Iron Company
Denver, Colorado

Owner

Colorado Department of Highways
Denver, Colorado

1989 Prize Bridge

RAILROAD

CSX RAILROAD OVER RELOCATED US 25E

Bell County, Kentucky

Located in the Cumberland Gap National Historical Park (Bell County, Ky. and Clairborne County, Tenn.), this single railroad track bridge had to blend with the natural environment. Aesthetic considerations ultimately resulted in a design of two 100-ft simple spans with a ballasted track on a concrete deck supported by a single composite steel box girder. ASTM A588 weathering steel and stone masonry facades for substructure abutments and piers also assisted in accomplishing those objectives.

Structural Designer

Howard Needles Tammen & Bergendoff
Alexandria, Virginia

General Contractor/Steel Erector

London Bridge Company, Inc.
London, Kentucky

Steel Fabricator

Carolina Steel Corporation
Greensboro, North Carolina

Owner

National Park Service
Middlesboro, Kentucky



1989 Prize Bridge

SHORT SPAN

Bridge No. 3013—MD Route 7 over Gunpowder River

Baltimore County, Maryland

Although a painted steel arch was probably more expensive than a conventional steel girder structure, aesthetics governed in this bridge design, selected to replace a deteriorating 120-ft reinforced concrete arch. However, the bridge was built and opened within the eight-month time frame dictated by contract. Speed of fabrication and erection more than offset higher costs because of site and traffic constraints.

Structural Designer/Owner

Maryland State Highway Administration
Office of Bridge Development
Baltimore, Maryland

Consulting Firm

Envirodyne Engineers
Chicago, Illinois

General Contractor

Central Atlantic Contractors, Inc.
Aberdeen, Maryland

Steel Fabricator/Erector

High Steel Structures, Inc.
Lancaster, Pennsylvania



Stand Up For Puddle Welds That Stand Out!

Our new CO₂ Automatic Puddle Welder lets operators stand up while welding steel decks. You can comfortably increase productivity while improving the quality of the weld itself.



The APW does away with the stick electrode and automates the welding process. You preset the welding parameters which insures consistent puddle diameter and penetration.

An inverter controlled power supply delivers perfect arc starts instantly. And arc cycle time is reduced. The arc spot gun lets the operator work without a face shield. With no slag to remove, the puddle can be checked at a glance.



consistent penetration

We estimate that you can double productivity even with less skilled operators. The increased maneuverability, the push/pull feeder and sliding design allow the operator to easily cover a working radius of 150 ft.

You'll quickly find that our stand up design helps you stand out in quality and productivity. Call 704/597-8240 or write OTC America for complete information.



consistent diameter



OTC AMERICA, INC.

5311 WT. Harris Blvd. West
PO Box 217037
Charlotte, NC 28221 U.S.A.
Tel 704/597-8240
Fax 704/333-9790

*1989 Prize Bridge***GRADE SEPARATION****HENDERSONVILLE BY-PASS/STATE ROUTE 6**

Sumner County, Tennessee

The need to eliminate a median pier support as well as to provide a 30-ft horizontal clear recovery zone from the edge of the traveled way to any fixed obstacle was successfully achieved by relying on the long-span capabilities of structural steel. The three-span, continuous welded plate girder bridge with composite concrete deck was constructed with no roadway expansion devices, thus making the structure virtually maintenance-free.

Structural Designer/Owner

Tennessee Department of Transportation
Division of Structures
Nashville, Tennessee

General Contractor

Vaughn Contractors, Inc.
Waverly, Tennessee

Steel Fabricator

Carolina Steel Corporation
Greensboro, North Carolina

Steel Erector

Sentry Steel Service Company, Inc.
Madison, Tennessee



It's good to have a choice . . .

Choose Experience

- Detailing expertise
- Engineering expertise
- Computer expertise
- Service expertise

Choose Solutions to

- Massive design revisions
- Fast track jobs
- Connection design responsibility
- Heavily architectural jobs
- Necessary shop optimization

Choose Variety

- Beams & Columns
- Connection Design
- Templates
- Ladder Systems
- Bracing
- Plate Work
- Pan and Grating Stairs
- Shop Management Reports
- Girt Walls and Door Frames

. . . it's GREAT to make the right one!

Make the profitable choice in Automated Detailing . . . choose PDS



Dogwood Technologies, Inc. 1900 Winston Rd., Suite 401 Knoxville, TN 37919
615-531-4073 800-346-0706

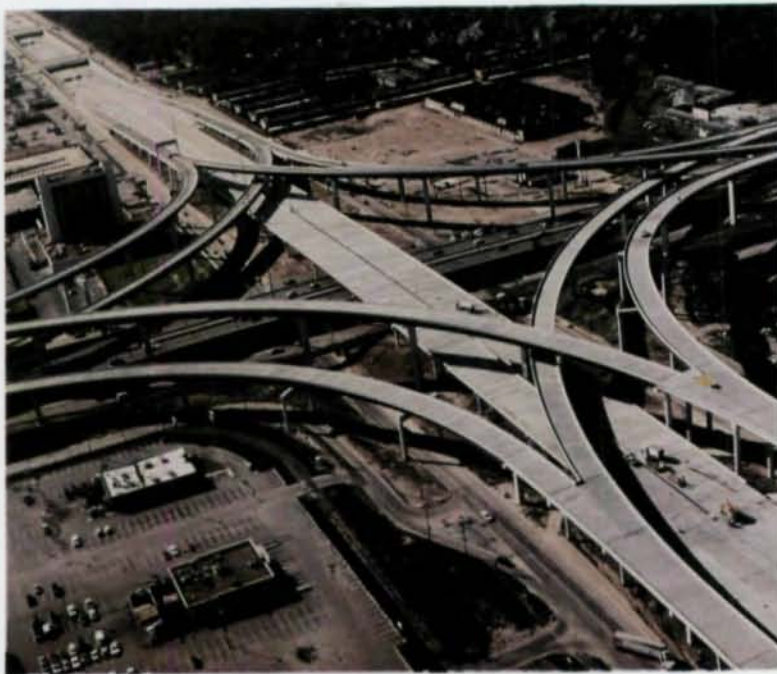
PDS Procedural
Detailing System

1989 Prize Bridge

ELEVATED HIGHWAY

SAM HOUSTON/I-10 INTERCHANGE

Houston (Harris County), Texas



This multi-level interchange includes eight connector bridges (4½ miles of bridge structures) and a new mainline bridge carrying the tollway over IH-10. All were designed using A588 structural steel, selected because of vertical clearance requirements, restricted site conditions and economic considerations. Spans up to 245 ft were required, with horizontal curves ranging up to nine degrees, requiring unusual design and construction techniques. Continuous units (78 to 90 in. in depth with flange thickness up to 3 in.) required the handling and placing of steel member segments up to 180 ft long and weighing nearly 100 tons. Because of the existence of an active fault line with continuous and substantial movement, the bridge design permits the bridge to be jacked up to offset differential movement caused by the fault.

M-STRU DL

*The Best Selling
Civil/Structural Program
Since 1987*

ANALYSIS

- 2D/3D Frame / Truss / Plate / Shell
- Static / P-Delta / Dynamic / RSA Analysis
- Capable of 1000's of joints and 100's of load cases
- Interactive geometry, deflection, mode shape, plots
- Interactive shear and moment diagram plots
- AISC Library included

DESIGN

- Interactive graphic menu driven design
- Continuous beam, section properties, frequency calculations
- AISC code check and sizing
- ACI column, beam, footing design
- Design details can be output to AUTOCAD
- Excellent in report presentations

GUARANTEE

M-STRU DL is superior in productivity and power. It has extremely flexible input/output options and supports most PC/XT/AT/PS2 hardware.

"JOIN THE WINNING TEAM"

Ask for a brochure today!

CAST
COMPUTER
AIDED
STRUCTURAL
TECHNOLOGY

P.O. Box 7326
Fremont, CA 94536-7326
(415) 795-0509

Structural Designer

Brown & Root U.S.A., Inc.
Houston, Texas

General Contractor/Steel Erector

Traylor Brothers, Inc.
Houston, Texas

Steel Fabricator

McDermott Marine Construction
Morgan City, Louisiana

Owner

Harris County Toll Road Authority
Houston, Texas



1989 Prize Bridge
MOVABLE SPAN
DANZIGER BRIDGE

New Orleans, Louisiana

Because of the unusual size of the bridge (a main span length of 320 ft clearing the entire width of the Industrial Canal), the owner selected a design seldom used due to fabrication complexity and comparatively high costs: a system of longitudinal steel boxes with an orthotropic deck. However, the system was lighter and smaller, and comparable in price to a two-truss system with greater lift system requirements. The design produced a cleaner, more aesthetic structure and provided the bridge operator a clear view of both navigation and vehicular traffic.

Structural Designer

Sverdrup Corporation
 St. Louis, Missouri

General Contractor/Steel Erector

Williams Brothers Construction Co., and
 Cianbro Corporation (Joint Venture)
 Houston, Texas

Steel Fabricator

USS Fabrication
 Orange, Texas

Owner

Louisiana Department of Transportation & Development
 Baton Rouge, Louisiana



1989 Prize Bridge
RECONSTRUCTED
CAPITOL BOULEVARD UNDERCROSSING

Olympia (Thurston County), Washington

One of the bridges scheduled as part of a 10-year project to widen seven miles of Interstate 5 through Olympia, this reconstructed undercrossing required four additional lanes of traffic and a new support system permitting existing piers to be removed while maintaining above- and below-bridge traffic at all times. A steel arch was the chosen design because it required minimal falsework, minimal traffic interruption—and the curved lines were considered more pleasing than the straight lines of a concrete sloped-leg frame (which had been proposed). Shop welding of thin, stiffened steel plates produced a strong, lightweight structure which was easy to ship, handle and erect.



Structural Designer/Owner

Washington State Department of Transportation
 Olympia, Washington

General Contractor/Steel Erector

David A. Mowat Company
 Bellevue, Washington

Steel Fabricator

Universal Structural, Inc.
 Vancouver, Washington

1989 Award of Merit

LONG SPAN

GLADE CREEK BRIDGE

Raleigh County, West Virginia

Structural Designer

Greiner, Inc.
Timonium, Maryland

Consulting Firm

Sheladia Associates, Inc.
Rockville, Maryland

General Contractor

PCL Civil Constructors, Inc.
Plantation, Florida

Steel Fabricator

Harris Structural Steel Company, Inc.
South Plainfield, New Jersey

Steel Erector

American Bridge Company
Pittsburgh, Pennsylvania

Owner

West Virginia Department of Transportation
Division of Highways
Charleston, West Virginia



1989 Award of Merit

MEDIUM SPAN, HIGH CLEARANCE

PINEY CREEK BRIDGE

Beckley (Raleigh County), West Virginia

Structural Designer

Pavlo Engineering Co., P.C.
New York, New York

General Contractor

National Engineering & Contracting Co.
Strongsville, Ohio

Steel Fabricator

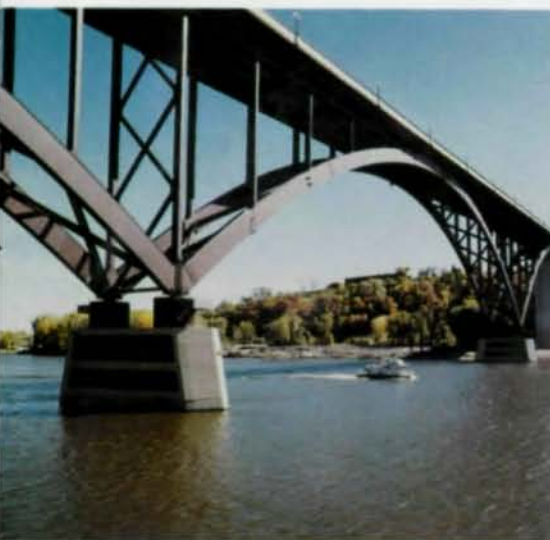
Bristol Steel & Iron Works, Inc.
Bristol, Virginia

Steel Erector

Broad, Vogt & Conant, Inc.
River Rouge, Michigan

Owner

West Virginia Department of Transportation
Division of Highways
Charleston, West Virginia



1989 Award of Merit

LONG SPAN

SMITH AVENUE HIGH BRIDGE

St. Paul (Ramsey County), Minnesota

Structural Designer

Strgar—Roscoe—Fausch, Inc.
Minneapolis, Minnesota

Consulting Firm

T. Y. Lin International
San Francisco, California

General Contractor

Edward Kramer and Sons, Inc.
Plain, Wisconsin

General Contractor/Steel Erector

Lunda Construction Company
Black River Falls, Wisconsin

Steel Fabricators

Phoenix Steel Inc.
Eau Claire, Wisconsin, and
Vincennes Steel Corporation
Vincennes, Indiana

Owner

Minnesota Department of Transportation
St. Paul, Minnesota

1989 Award of Merit

MEDIUM SPAN, LOW CLEARANCE

BROADWAY BRIDGE OVER CHERRY CREEK

Denver, Colorado

Structural Designer

Howard Needles Tammen & Bergendoff
Denver, Colorado

General Contractor/Steel Erector

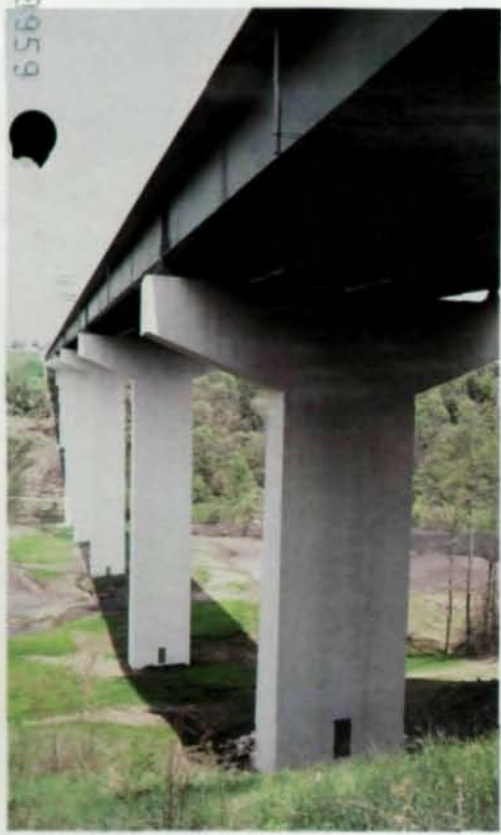
Centric-Jones Constructors
Lakewood, Colorado

Steel Fabricator

Avondale Industries
Avondale, Louisiana

Owner

City and County of Denver
Denver, Colorado



1989 Award of Merit
MOVABLE SPAN
LIBERTY BRIDGE

Bay City, Michigan

Structural Designer
Howard Needles Tammen & Bergendoff
Kansas City, Missouri

General Contractor
Midwest Bridge
Williamston, Michigan

Steel Fabricator
Phoenix Steel, Inc.
Eau Claire, Wisconsin

Steel Erector
Alliance Steel
Superior, Wisconsin

Owner
City of Bay City, Michigan



1989 Award of Merit
SHORT SPAN
LECHMERE CANAL BRIDGE

Cambridge, Massachusetts

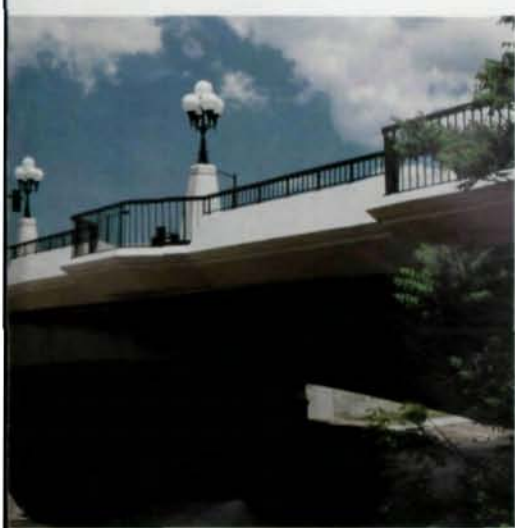
Structural Designer
Howard Needles Tammen & Bergendoff
Boston, Massachusetts

General Contractor
John Mahoney Construction Co., Inc.
Milton, Massachusetts

Steel Fabricator
Bancroft & Martin, Inc.
South Portland, Maine

Steel Erector
Rusco Steel Co.
Warwick, Rhode Island

Owner
Commonwealth of Massachusetts,
Department of Public Works
Boston, Massachusetts



1989 Award of Merit

ELEVATED HIGHWAY OR VIADUCT

CIVIC CENTER INTERCHANGE

Providence, Rhode Island



Structural Designer

Maguire Group Inc.
Providence, Rhode Island

General Contractor

Aetna Bridge Company
Pawtucket, Rhode Island

Steel Fabricator

High Steel Structures, Inc.
Lancaster, Pennsylvania, and
Carolina Steel Corporation
Greensboro, North Carolina

Steel Erectors

Aetna Bridge Company
Pawtucket, Rhode Island, and
Northeast Steel Corporation
Wickford, Rhode Island

Owner

Rhode Island Department of Transportation
Providence, Rhode Island

1989 Award of Merit

SPECIAL PURPOSE

WADDELL "A" TRUSS BRIDGE

Parkville (Platte County), Missouri

Structural Designer

Howard Needles Tammen & Bergendoff
Kansas City, Missouri

Steel Erector

Bratton Corporation
Kansas City, Missouri

Owner

City of Parkville, Missouri

STATE OF THE ART
Personal Computer Software
for Structural Engineers

SAP90™ - General Analysis
& Design
ETABS® - Building Analysis
& Design
SAFE™ - Slab Analysis
& Design

Developed by Edward L. Wilson
and Ashraf Habibullah

- Internationally recognized developers & capacity
- Unmatched performance & capacity
- Thorough documentation & verification
- Extensive user support & backup
- Interactive graphical model generation

For more information, contact:

Computers & Structures, Inc.
1918 University Avenue • Berkeley, CA 94704
(415) 845-2177 • FAX (415) 845-4096
5101003830 CSI BERKELEY



1989 Award of Merit

RAILROAD

PATTERSON AVENUE/CSX GRADE SEPARATION

Grand Rapids (Kent County), Michigan

Structural Designer

Williams & Works, Inc.
Grand Rapids, Michigan

General Contractor/Erector

Argersinger-Morse Construction Co.
Ann Arbor, Michigan

Steel Fabricator

Phoenix Steel, Inc.
Eau Claire, Wisconsin

Owner

Kent County Road Commission
Grand Rapids, Michigan



1989 Award of Merit

RECONSTRUCTED

MERRIAM STREET BRIDGE OVER MISSISSIPPI

Minneapolis (Hennepin), Minnesota

Structural Designer/Owner

Hennepin County Bureau of Public Service
Minneapolis, Minnesota

Consulting Firm

Van Doren-Hazard-Stallings, Inc.
Minneapolis, Minnesota

General Contractor

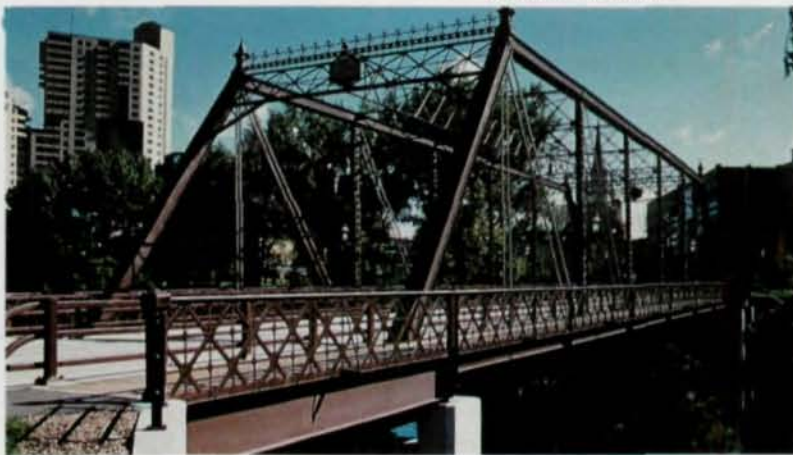
Lunda Construction Company
Black River Falls, Wisconsin

Steel Fabricator

Phoenix Steel, Inc.
Eau Claire, Wisconsin

Steel Erector

Alliance Steel Construction, Inc.
Superior, Wisconsin



1989 Award of Merit

RECONSTRUCTED

**ROEBLING DELAWARE
AQUEDUCT BRIDGE**

Lackawaxen (Pike County), Pennsylvania and
Minisink Ford (Sullivan County), New York

Structural Designer

Ammann & Whitney
New York, New York

Architectural Designer

Beyer Blinder Belle
New York, New York

General Contractor/Fabricator/Erector

Chesterfield Associates, Inc.
Westhampton Beach, New York

Owner

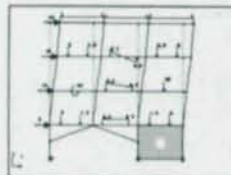
National Park Service
Narrowsburg, New York



RISA-2D

Rapid Interactive Structural Analysis

- Spreadsheet input
- Steel design
- Shear walls
- P-delta effects
- UBC 88 lateral force calc's
- Fast graphics



Here's what our users are saying:

"We looked at 20+ frame analysis programs and RISA-2D had the best combination of features, ease of use and price. RISA-2D isn't the only program we have, but it's the only one we use."

— Ed Triece
Jose I. Guerra, Inc.
Austin, Texas

"You have produced an excellent and very useful product. Our compliments to the chef!"

— Milton Alpern, P.E.
Alpern and Salter Consulting Engineers
Bellmore, New York

"This is the '1-2-3' of engineering programs."

— Mark Jokerst
Forell/Eisesser Engineers, Inc.
San Francisco, California

For a FREE Demo, call: 1 (800) 332-7472

17900 Sky Park Circle, Suite 106
Irvine, CA 92714



AISC INTRODUCES THE 9TH EDITION

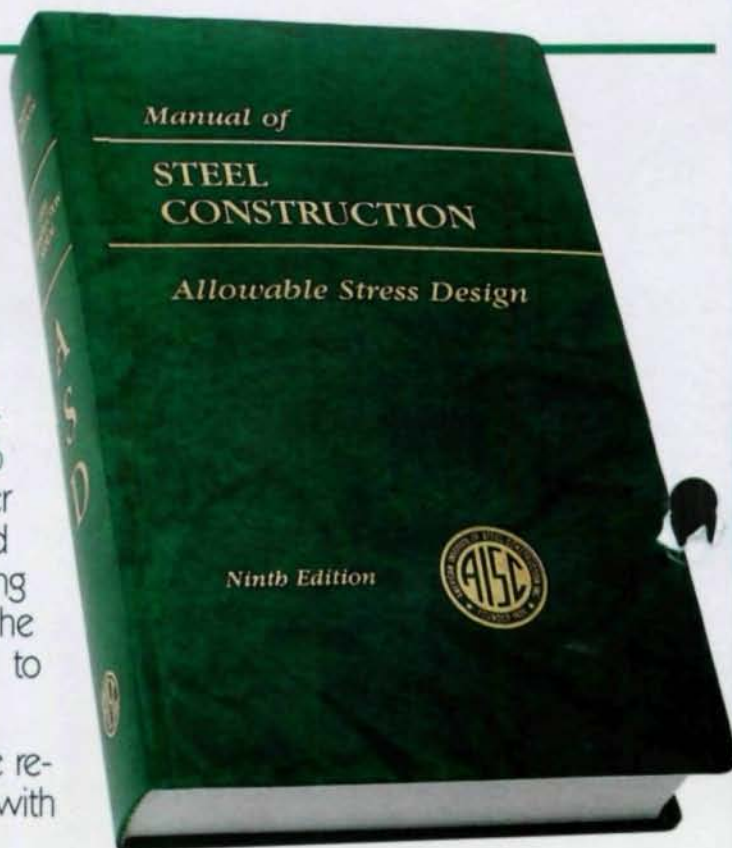
ALLOWABLE STRESS DESIGN MANUAL OF STEEL CONSTRUCTION

FIRST REVISION SINCE 1980

Steady progress and improvements in the manufacture, design and fabrication of structural steel over the past nine years have made it necessary for AISC to revise the **Manual of Steel Construction**.

The 9th Edition is a major modification that includes the 1989 Specification for Structural Steel Buildings—Allowable Stress Design and Plastic Design; the 1985 Bolt Specification and the 1986 revised Code of Standard Practice. The number of design aids and examples has been expanded and updated. New easier-to-use tables, including Uniform Load Tables, improve the usability of the Manual, and tabular copy has been changed to reflect new materials.

All chapters have been modified to include results from nine years of research and development with extensive changes in rules governing connections.



PRICE: \$60.00

NEW • CHANGES

- TABLES
- DIMENSIONS
- BEAMS
- COLUMNS
- CONNECTIONS
- CODES & SPECIFICATIONS



**A MUST FOR STEEL
CONSTRUCTION!**

AMERICAN INSTITUTE OF STEEL CONSTRUCTION

P.O. BOX 806276, CHICAGO, IL 60680-4124

Member Discount 25%

I enclose payment of \$ _____ for _____ copies of the
9th Edition AISC **Manual of Steel Construction** at \$60.00 each.

NAME/TITLE _____

COMPANY _____

ADDRESS _____

CITY/STATE/ZIP _____

Please enclose remittance. No C.O.D. orders. In New York, California, and Illinois add sales tax. Shipping charges prepaid in U.S. On shipments outside the U.S., add 10% of total purchase for postage and handling.

Charge My Visa MasterCard

Card No. _____ Exp. _____

Signature _____

1966
0951

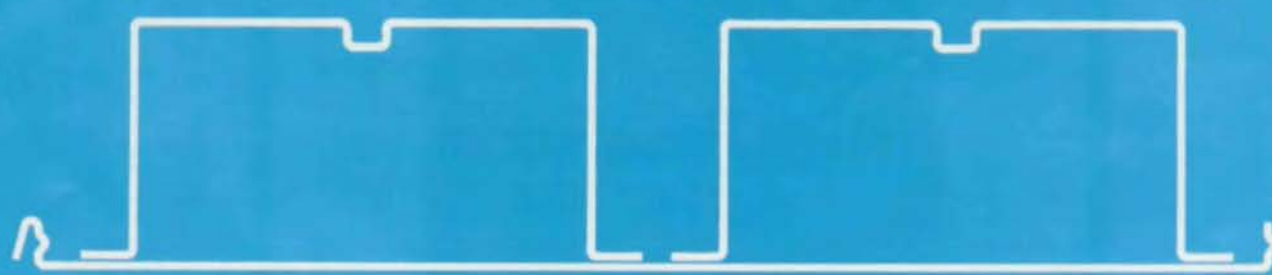
EPIC LONG-SPAN DECKS



E750-SPANS TO 32 FT.
E600-SPANS TO 26 FT.
E450-SPANS TO 23 FT.
E300-SPANS TO 15 FT.

AVAILABLE FOR DELIVERY—NOW

Galvanized G60-G90
Lengths to 50 ft.



Plated Decks—Plain or perforated
Most complete line of deck products
in $\frac{5}{8}$ " to $7\frac{1}{2}$ " depths

OUR SERVICE WILL SAVE YOU TIME & MONEY

Epic has these profiles available for shipment on an A.S.A.P. Basis!

Your order will be processed in One Week in most cases. Ask about our A.S.A.P. Service.

Call (412) 351-3913 today for price and delivery information and for product advice on all types of Form Decks, Composite Decks, Long-Span and Roof Decks.

Manufacturing Plants:

- Pittsburgh, Pa.
- Chicago, Ill.
- Lakeland, Fla.

Dealer Inquiries Invited

EPIC[®]
METALS CORPORATION

Eleven Talbot Avenue, Rankin, PA 15104
PHONE: 412/351-3913
TWX: 710-664-4424
EPICMETAL BRDK

TAKE CONTROL.



Information shared through the Steel Fabrication Computer System from Design Data allows you to take control of the following

- Estimating
- Material Ordering
- Detailing
- Connection Design
- Inventory Control
- Production Control
- Downloading to CNC Equipment
- Job Cost

Take control with the Steel Fabrication System from Design Data. *It's time...*

DESIGN DATA 

"Software For The Professional"

800-443-0782

DESIGN DATA