MODERN STEEL CONSTRUCTION

August 1992

$3.00

Architecturally Exposed Steel

UNITED STEEL DECK, INC.

ROOF DECK DATA BASE

DECK DESIGN DATA SHEET

No. 17

Attribute	Type B Deck (B, BI, BA, BIA)				Type F Deck			Type N Deck (NS, NI, NSA, NIA)			
gage	22	20	18	16	22	20	18	22	20	18	16
thickness	.0295	.0358	.0474	.0598	.0295	.0358	.0474	.0295	.0358	.0474	.0598
weight, psf	1.7	2.1	2.8	3.5	1.6	2.0	2.6	2.1	2.5	3.3	4.1
I_p, in.^{4} (1)	0.17	0.24	0.31	0.40	0.13	0.17	0.24	0.64	0.82	1.19	1.62
I_n, in.^{4}	0.20	0.24	0.32	0.40	0.15	0.19	0.25	0.85	1.04	1.38	1.75
S_p, in.^{3}	0.19	0.25	0.34	0.44	0.13	0.16	0.22	0.37	0.49	0.68	0.88
S_n, in.^{3}	0.20	0.26	0.36	0.45	0.14	0.17	0.23	0.42	0.54	0.74	0.93
Ext.R(2),lbs.	450	620	1010	1860	440	610	1000	320	450	760	1410
Ext.R(3),lbs.	540	730	1160	2100	540	720	1140	390	530	870	1590
Int.R(4),lbs.	1270	1830	3120	4670	1250	1800	3070	940	1370	2370	3800
Int.R(5),lbs.	1320	1880	3200	4750	1320	1880	3190	1090	1580	2700	4020
V(6), lbs.	1920	2300	3000	3780	1970	2360	3120	2350	3390	4960	6180
Max.1 span(7)	5'10"	6'8"	8'0"	9'1"	5'2"	5'11"	7'0"	11'5"	13'0"	15'8"	18'3"
Max.2 span(8)	6'11"	7'10"	9'5"	10'9"	6"1"	7'0"	8'4"	13'5"	15'3"	18'5"	21'6"
Max. Cant.(9)	1'11"	2'4"	2'10"	3'3"	1'2"	1'5"	1'10"	3'6"	4'0"	4'10"	5'5"
FMS span(10)	6'0"	6'6"	7'5"		4"11"	5'5"	6'3"				

NOTES

(1) I_p, I_n, S_p, and S_n are the section properties per foot of width. These values were calculated using the American Iron and Steel Institute Specifications. The subscripts denote positive or negative bending.

(2) Allowable end reaction per foot of deck width -- 2" bearing.

(3) Allowable end reaction per foot of deck width -- 3" bearing.

(4) Allowable interior reaction per foot of deck width -- 4" bearing.

(5) Allowable interior reaction per foot of deck width -- 5" bearing.

(6) Allowable vertical shear per foot of width -- do not confuse this with horizontal shear strength provided by the diaphragm.

(7) Maximum span recommended for roof construction based on SDI criteria -- single span.

(8) Maximum span recommended for roof construction based on SDI criteria -- 2 or more spans.

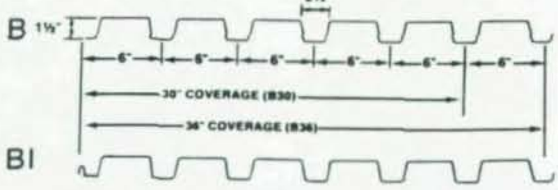
(9) Maximum recommended cantilever span based on SDI criteria; these spans are sensitive to the length of the adjacent span as they are controlled by deflection. Call if you need a more precise calculation.

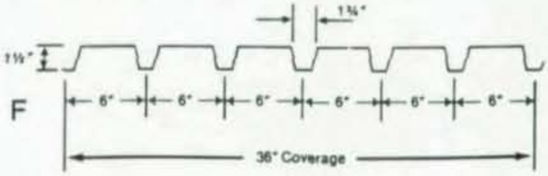
(10) Maximum spans for Factory Mutual Class I construction. Factory Mutual will allow these spans to be extended by 10% (maximum) when the insulation is mechanically fastened to the deck by screws and plates. Whenever this extension is used, sidelap fastening must occur at 18" (maximum) rather than the normal 36". Refer to the Factory Mutual System Approval Guide.

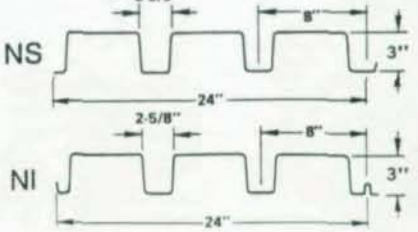
(12) B is generically known as "wide rib" deck; F is "intermediate" rib, and the 3" deep N deck is "deep rib".

(13) The deck type B means flat side lap; BI is the "interlocking" side lap; BA and BIA means the decks are acoustic. F deck is only available with the flat sidelap. NS is flat sidelap; NI is "interlocking" and NSA and NIA are acoustic decks. Better sidelap connections are obtained by screwing or welding through the flat sidelaps and therefore this is the recommended type.

(14) Information not provided on this chart may be obtained by calling our office in Summit, NJ.







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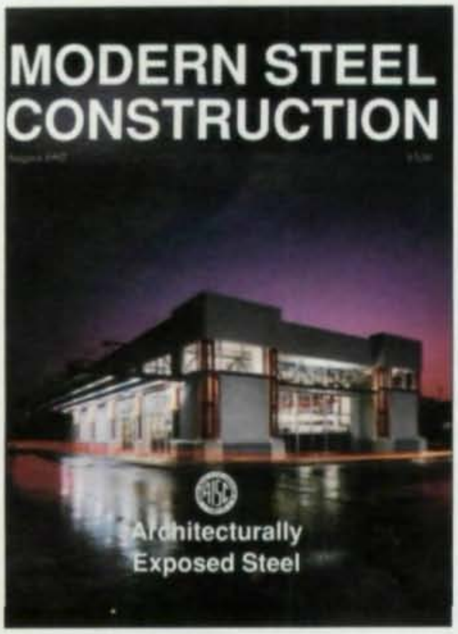
MODERN STEEL CONSTRUCTION

Volume 32, Number 8 August 1992



A new drive-thru dry cleaners in Memphis is doubly functionally designed. The layout is convenient for the workers, and the architecture serves as a billboard to attract the attention of drivers on nearby roads. For more information on this beautiful project, turn to page 24. Photo by Jeffrey Jacobs/Nims Studios

FEATURES

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Urban Decline

The last time I was in St. Louis, I was struck with how little traffic there seemed to be, even during rush hour. I asked a friend about this, and she commented that St. Louis' roadways had been designed before World War II with the anticipation that the city's population and workforce would grow. But with the emphasis—both for homes and offices—on the suburbs after the war, the growth never occurred, and in fact there was some shrinkage, she explained.

While St. Louis' lack of urban congestion may be the exception, the continuing growth of the suburbs does present a serious problem to anyone concerned with this country's infrastructure.

When the U.S. moved from a farm-based economy to an industrial economy, workforces moved to the city. With this great concentration of people in one location, it was economically feasible to create a great infrastructure system—both for waste disposal, power distribution, and, of paramount importance, transportation.

Today, increasingly, housing is moving further and further from the urban core and suburbia is extending in ever growing circles, making public transportation an extreme hardship. And with few patrons, less money is available for maintaining a city's infrastructure, which encourages more people to leave, and further reduces the availability of funds.

Chicago is a great example. At one time, it's rapid transit system was superbly efficient. Bus lines in the neighborhoods fed into rail lines and moved people from their homes to their jobs. In 1974, Sears capitalized on the primacy of public transportation and moved more than 5,000 workers into the world's tallest building—and approximately 80% of them used mass transit. But by the mid-1990s, these workers will be moving to the far suburbs. The question is, how will Chicago's transportation system handle the loss of these riders? And just as importantly, how will the suburbs pay for a transportation system to handle this influx?

The warnings about a decaying infrastructure are everywhere. It's time for public policy to recognize the importance of the city and emphasize that urban renewal is crucial to the survival of both cities and suburbs. **SM**

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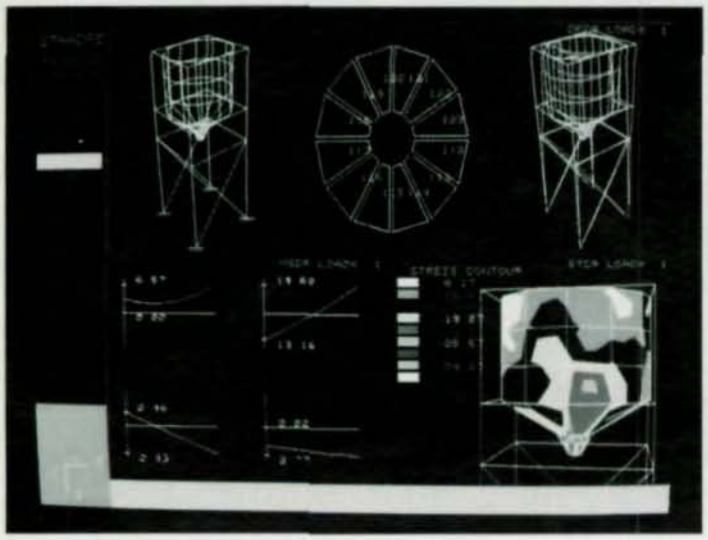

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Steel Interchange

Steel Interchange is an open forum for *Modern Steel Construction* readers to exchange useful and practical professional ideas and information on all phases of steel building and bridge construction. Opinions and suggestions are welcome on any subject covered in this magazine. If you have a question or problem that your fellow readers might help to solve, please forward it to *Modern Steel Construction*. At the same time feel free to respond to any of the questions that you have read here. Please send them to:

Steel Interchange
Modern Steel Construction
1 East Wacker Dr.
Suite 3100
Chicago, IL 60601

Answers and/or questions should be typewritten and double spaced. Submittals that have been prepared by word-processing are appreciated on computer diskette (either as a wordperfect file or in ASCII format).

The opinions expressed in *Steel Interchange* do not necessarily represent an official position of the American Institute of Steel Construction, Inc. It is recognized that the design of structures is within the scope and expertise of a competent licensed structural engineer, architect or other licensed professional for the application of principles to a particular structure.

Information on ordering AISC publications mentioned in this article can be obtained by calling AISC at 312/670-2400 ext. 433.

The following responses to questions from previous Steel Interchange columns have been received:

When would you justify the additional cost of high bond epoxy paint and coating for an exterior steel frame exposed to weather and water?

Epoxy coating, often topcoated with urethane finishes and always over a high degree of surface preparation are indicated under the following situations or combinations thereof.

1.) When Appearance is very important, as in architectural metal, decorative metal supports or substructures, which are exposed to atmospheric weathering.

2.) Long term durability, where failure due to corrosion might be catastrophic.

3.) Long term durability, where repainting or repair of coatings would be difficult or impossible due to site conditions.

4.) Exposure to corrosive atmospheres such as industrial sites where galvanizing or lesser coatings would be subject to attack.

Walter C. White
White Industrial Painters, Inc.
Trinity TX

What procedures should be followed when assessing steel that has been exposed to a fire?

The Question is really one of economics. If the steel can be straightened for less money than fabricating a new piece, then that should be done. The heat of a fire will not usually harm the steel. A good discussion of this is published in the Proceedings to the 1960 AISC National Engineering Conference, *Structural Steel After a Fire*, by F. H. Dill.

When would you justify the additional cost of high bond epoxy paint and coating on a column if there is standing water at the base of a column?

No problem! Many good coatings are available to line water tanks, and coated drilling rigs stand in the water offshore for many years. The best solution is to drain the standing water, if possible, but coatings will last for years.

Walter C. White
White Industrial Painters, Inc.
Trinity, TX

How has the recent allowance of snug-tight high-strength bolting for certain types of shear/bearing connections affected your projects?

Snug-tight bolts, permitted in certain bearing-type connections, are not being used as often as they might be. One reason is that it is less expensive to install a "twist-off" bolt which, of course, provides pretension. Also, many engineers are still not aware of the enabling specification provision. Inspectors also need more education. Finally, some companies with a vested interest in tension indicating devices have been very effective in persuading engineers that it is important to accurately pretension all bolts, even though such pretension may not be important in the structural performance of the connection.

Robert O. Disque
Besier Gibble Norden Consulting Engineers, Inc.
Old Saybrook, CT

Steel Interchange

How do you decide when to use doubler plates and when to increase the size of the column?

With reference to the above question, we would like to share our experience as we recently evaluated three alternatives for a column. They were:

1.) A built-up section customized to closely match the column requirements with minimum steel.

2.) An undersized rolled section that required doubler plates to meet the column requirements.

3.) A rolled section, although oversized, that would meet the column requirements without any additional plates.

The analysis was essentially based on the following economic comparison. The costs for the three options were based on the cost of the steel as it arrived at the fabricator, then considering fabrication costs prior to the common work for the connections.

Number 3 weighs the most, and at this point has a cost for the steel based on the column height, and needed no fabrication work prior to that for the connection.

Number 2 weighs less, but needs to have the doubler plates attached. The lower cost of the steel alone for Number 2 compared to Number 3 is then analyzed as "buying" fabricating time to bring it up to the required section for the column. Dividing the amount of the monetary difference by the fabricator's charge per hour gives the time available to do the fabricating work. If the doubler plates can't be installed in the time that has been bought, then the oversized rolled section (No. 3) is more economical.

In our case the labor intensive fabricating operation was too costly for the fabricating time bought.

Also, in our case, Number 1 was not considered further as the fabrication involved would be even more time consuming, and therefore more costly, despite the fact that it was the lowest weight and the cost of the steel alone was the lowest of the three alternatives.

Arnold J. Kiner
Lichtenstein Engineering Associates, P. C.
New York, NY

New Questions

Listed below are some questions that we would like the readers to answer or discuss. If you have an answer or suggestion please send it to the Steel Interchange Editor. Questions and responses will be printed in future editions of Steel Interchange Also if you have a question or problem that readers might help solve, send these to the Steel Interchange Editor.

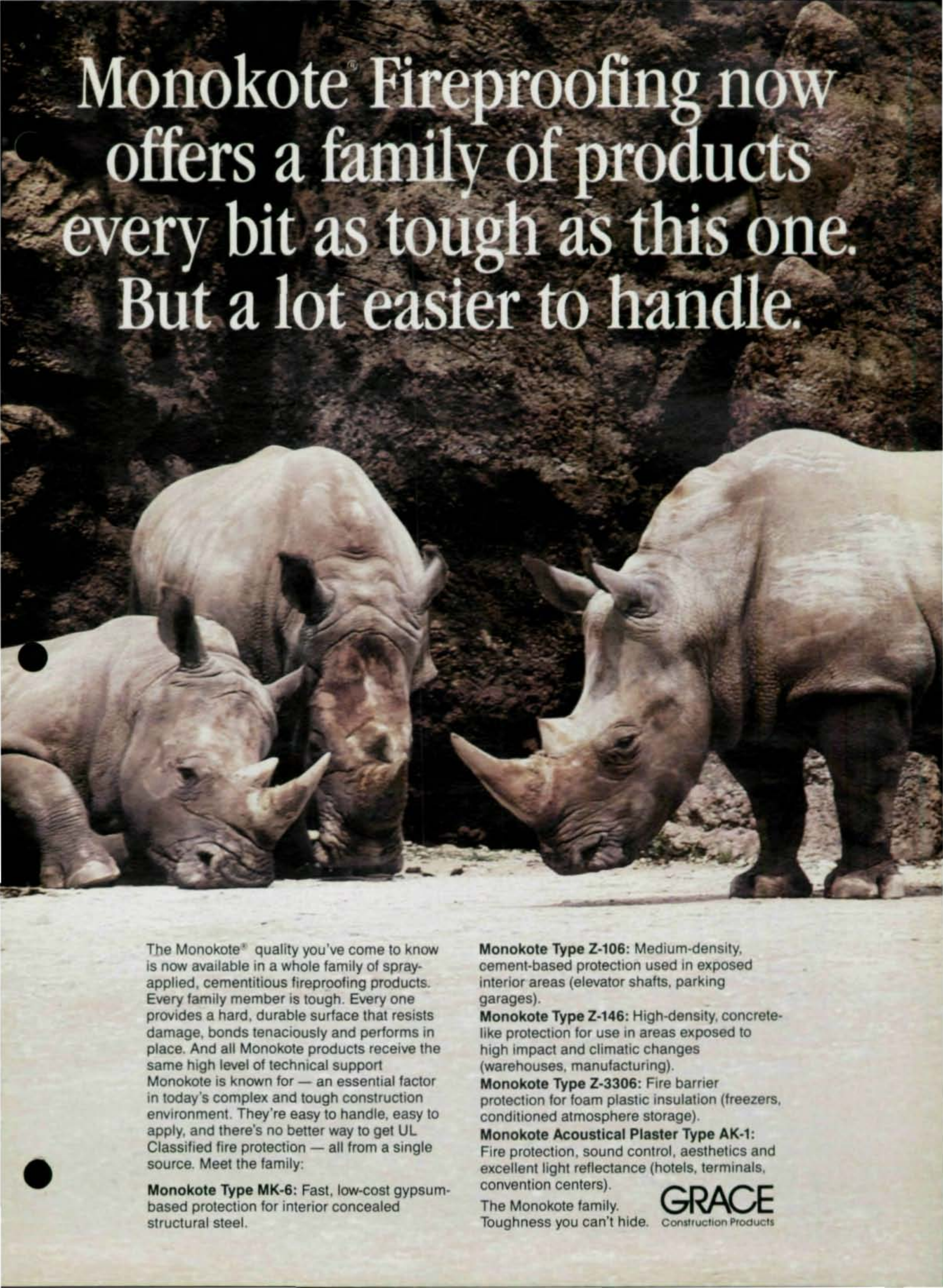
1. Regarding beam to column simple shear connections, is there a general "rule-of-thumb" as to when the different types of connections are more advantageous? For example, would a stiffened seated bolted type bolted type connection be the more prudent type versus a double angle welded framed connection when a beam or girder is connected to a column web? Beam to column design loads as well as fabricator costs would obviously play major roles in answering this question. However, it has been my experience that situations occur in which four or five different types of simple shear connections would suffice.

Also, can beam to column seated and stiffened connections be considered wind connections or partially restrained?

Charles F. Canitz, P.E.
Department of the Army
Baltimore, MD

2. Are washers required in connections with slotted holes because of strength requirements or are there additional reasons?

3. Are there any design requirements that an engineer can follow when designing lateral bracing?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STEEL CORRESPONDENCE

The Need For Help-Wanted Ads

Dear Editor:

As a current AISC active member, we feel it would be very desirable for your publication, *Modern Steel Construction*, to accept fabricators classified help-wanted advertising. This service would be advantageous to your membership and a tremendous service to the audience. Therefore, we respectfully request that you reconsider your current policy.

Sincerely,
Fred A. Wilson, Jr.
President
Industrial Steel Inc.

MSC Response: *Good news! Beginning with this issue (see page 42), Modern Steel Construction will accept classified advertising—including help wanted ads.*

Another View On Multi-Certified Steel

Dear Editor:

There has been increased discussion among consulting engineers, fabricators and structural shape producers, most recently at the 1992 AISC National Steel Conference, on the subject of "multi-certified" steel.

We were pleased to see a response form consulting engineer Pat Ryan in the June issue of *Modern Steel Construction*. We believe his timely letter may be representative of some of the concerns from the engineering community on "multi-certified" ("multi-grade", "dual-cert", or "tri-cert") steel.

Other "Letters to the Editor" from a producer in the April and June 1992 issues highlight a few of the advantages of high strength steel (ASTM A572 Gr. 50), i.e., reducing the cost of a steel frame. However, Pat Ryan points out the concern of specifying ASTM A36 in a particular application, a seismic resisting frame mixed with high strength steel, and that an "A36" link beam might be stronger than a "A572" diagonal or column member, altering the expected behavior of the design.

Nucor-Yamato Steel, while being able to produce "dual" or "tri-cert" material at the request of customers, provides ASTM A36 product distinct from its ASTM A572 Grade 50 or "tri-cert" product. Our ASTM A36 product yield strength ranges are typically from 43-55 ksi, with tensile strength ranging from 60-70 ksi, and our ASTM A572 Gr. 50 product typically ranges in yield strengths of 52-64 ksi, with tensile strengths of 68-78 ksi.

Steel's strength is a function of many variables, e.g., alloys (carbon, manganese, silicon, and vanadium or columbium), residual elements from being scrap-based (chromium, nickel, molybdenum, copper), finishing temperature, section size, and cooling rate.

Due to the many variables in the steelmaking and rolling process, controlling the strength range *consistently* to 4 ksi (plus/minus 2 ksi), as mentioned in one producer's response, may lead the specifier to believe that such close ranges are generally available. We, at Nucor-Yamato, believe it more realistically can be controlled to a more (consistently) moderate range of 12 ksi (plus/minus 6 ksi).

As a producer, we would like to hear from more specifiers on their concerns on the desired material specifications. The producers are moving toward a 50 ksi base grade and would like to have considerably more input from specifiers and end-users. Providing the engineer with the desired material in accordance with the proper specification is our goal. It remains our commitment.

Sincerely,
Michael F. Engestrom
Marketing Engineer
Nucor-Yamato Steel Sales Corp.

Quality Certification Requirements

Dear Editor:

In the editorial of the June issue of *Modern Steel Construction*, a recommendation is made that steel specifications require that fabricators be AISC certified. This sounds like an excellent idea to me; however, before instituting this, I would like to know:

1. What are their requirements for certification?
2. What is the availability of AISC certified fabricators in my area?

I would appreciate your sending me this information, or notifying me as to where I can obtain it.

Sincerely,
Paul de Silva
Schaardt & Fullan Architects, P.C.
Bellmore, NY

Thomas Schlafly, AISC Director of Fabricating Operations and Standards, replies:

The AISC Quality Certification Program is intended to help the construction community distinguish fabricators that have quality programs from those that do not.

The size of the plant and its niche in the structural market are not factors in judging shops. However, given the different requirements of the many types of work done by structural fabricators, three classes of certification were developed. To prevent any conflict of interest an independent company was selected to perform the reviews—a major part of the certification process. ABS/QE, a division of the American Bureau of Shipping, was selected because they had experience in reviewing steel fabrication and welding work from their business of classifying ships.

The program concentrates on organization, experience, equipment, and procedures required to provide material complying with common project specifications at a level of quality commensurate with the sophistication of the job. Rather than being an inspection program that would look at each individually fabricated pieces, the program is aimed at reviewing the qualifications of the personnel, the organization and procedures to assure that the company had the capability to do the job.

The program has provisions for the original three categories, Category I, Conventional Steel Structures; Category II, Complex Steel Structures; and Category III, Major Steel Bridges. In addition, plants can ask for a review of their Fracture Critical experience and, if the need were to arise again, there are provisions for a Nuclear Supplement. AISC also administers a program to certify Metal Building Manufacturers with the designation Category MB.

The distinction between Category I and II is best made by listing typical types of structures considered to be a part of the category:

Category I

Small public service buildings and institutional buildings (schools, etc.); shopping centers; light manufacturing plants; miscellaneous and ornamental iron; warehouses; sign support structures; low rise truss/ beam/ column structures; and simple rolled beam bridges (without welded cover plates).

Category II

Large public service buildings; heavy manufacturing buildings; powerhouses; metal producing/rolling facilities; crane girders; bunkers; auditoriums; bins; high-rises; petro/chemical facilities and high-rise buildings.

Other Classes

Category III and MB are self-evident, except it should be noted that a distinction is made for those fabricators with fracture critical capabilities upon their request and successful review.

The requirements for certification consist of the documentation of organization and procedures used to implement quality assurance and the successful completion of an annual review conducted by the independent auditing firm. The questions forming the auditors checklist were developed by the AISC Committee on Fabricating Operations and Standards in conjunction with a review committee of approximately 35 practicing engineers and is updated regularly.

Administratively, the program runs on three year cycles. The initial review and those conducted every three years thereafter are considered "full" reviews and consist of a check of all items on the checklists. The reviews in the intermediate years are conducted with a minimum of forewarning from the essential items on the checklist, marginal items from the previous review and a random selection of non-essential items from the checklist. The minor abbreviation permits a cost reduction and helps keep the program within the financial capabilities of smaller shops. The minimum acceptable quality standards are defined by the checklists and "objective criteria" that are developed and maintained by the governing committee.

Five departments are inspected at each facility: General Management; Drafting; Purchasing; Operations; and Quality Control. Each department must have an organization and job functions that promote communication of quality requirements to the forces performing the work and experienced key personnel to oversee the workings of each department. There must also be procedures to review projects to make sure the particular facility is capable of performing the work, control design and specification documents, control shop fabrication documents, control and marking of material.

Welding must be done by AWS qualified personnel to qualified procedures. Material and equipment has to be adequate and maintained in a manner that will produce good work.

Bolting procedures and equipment must be in place. Weld procedures must be used and the appropriate provisions of AWS must be followed.

Painting equipment and gages must be available and working. The quality department is to have a Certified Weld Inspector available (though not necessarily on staff) and is checked to ensure that there are NDT technicians on staff. Quality Control must have the authority to stop work if there is a problem.

The differences between categories include differing requirements for equipment, experience of personnel, procedures appropriate for the various types of work anticipated within each category and a separation between Quality and Production in the organization. Certain aspects within a category are considered essential and every certified fabricator has to comply with those requirements. Non-essential aspects within a category must be complied with to a degree that indicates to the auditor that a level of quality is regularly achieved that is commensurate with the common requirements encountered in the type of work anticipated within the category.

As of mid-1992 there are more than 300 certified structural fabricating plants and 45 metal building plants. With interest in certification from Europe and growing concern about following procedures from the various building codes, the program is growing. To find out more about certified fabricators in your area, contact:

American Institute of Steel Construction, Inc., One East Wacker Dr., Suite 3100, Chicago, IL 60601-2001.

AISC certifies facilities regardless of whether or not they are members of AISC, though AISC members do receive a discount. Foreign plants also can be certified.

Philosophically, the program is aimed at being attainable for all shops and is a measure of quality and the commitment of management to providing an appropriate class of work.

The effect of the size of an organization is minimized in scoring the performance in the program and reviews are done annually to avoid the costs of more frequent inspections while being capable of reviewing records to assure that procedures were followed during the course of the year.

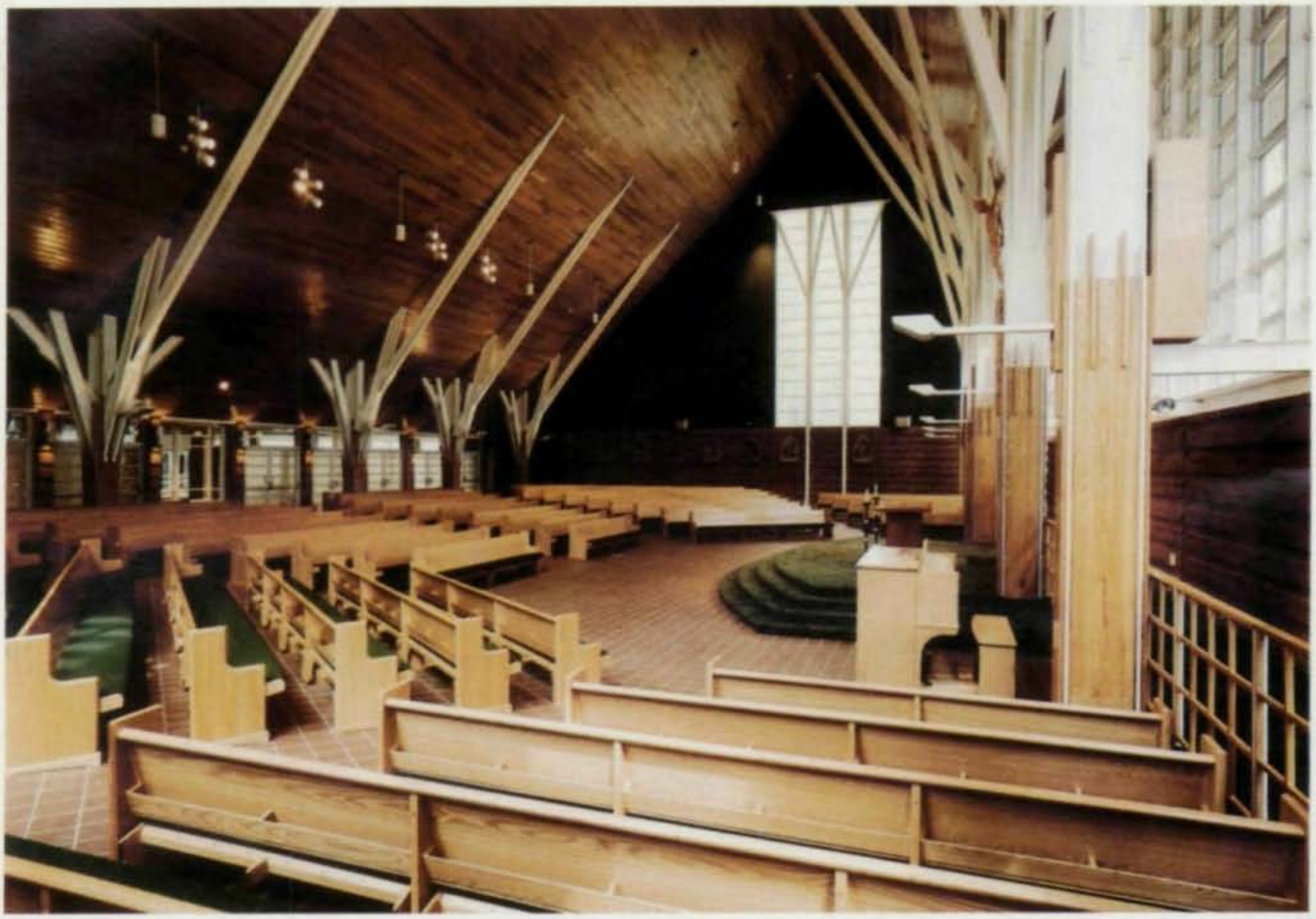
August 18-19. **Welding Structural Design two-day seminar,** Houston. Designed to provide engineers and welding inspectors a greater understanding of weld mechanics and welded engineering structures. Contact: AWS, 550 N.W. LeJeune Road, P.O. Box 351040, Miami, FL 33135 (800) 443-9353.

September 17. **Steel Bridge Forum**, Richmond, VA. Contact: Camille Rubeiz, Steel Bridge Forum, c/o AISI, 1101 17th St., N.W., Suite 1300, Washington, DC 20036 (202) 452-7190.

October 1. **The Rational Use Of Composite Concrete and Steel Construction,** Chicago. Keynote speaker will be Ceasar Pelli of Ceasar Pellin and Associates. Contact: S.P. Asrow Associates, Ltd. (312) 939-2150.

September 22-24. **Fracture & Fatigue Control in Structures** short course, Lawrence, KS. Contact: The University of Kansas, Division of Continuing Education, Attn: Management Programs, Continuing Education Building, Lawrence, KS 66045-2608 (913) 864-3968.

October 5-6. **Central Fabricators Meeting**, Union League Club, Chicago. General topic: fabrication and operations. Contact: LaVerne Duckrow, 7227 W. 127th St., Palos Hills, IL 60463 (708) 361-2332.



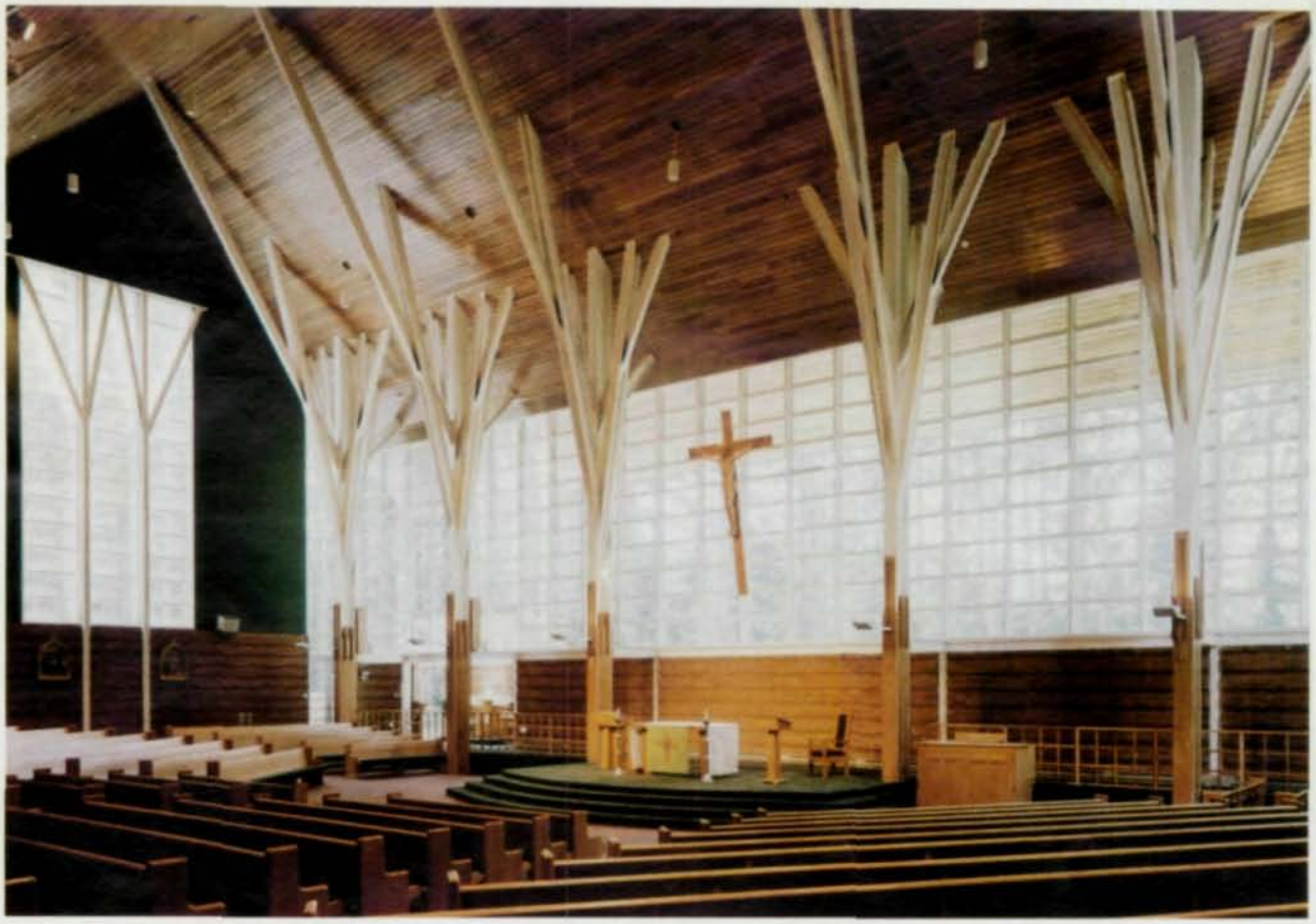
Steel Trees

Branching steel members were used both sculpturally and structurally inside a New York Catholic Church

During the past three decades, Catholic churches have undergone a dramatic transformation. No longer are they designed as imposing structures; rather their design reflects Rome's desire to more fully integrate congregations into church activity.

Church design reflects this change in attitude in both small changes—such as facing the pulpit towards the congregation instead of the altar—and large changes—such as creating smaller, more intimate worship areas. In addition to responding to Rome's overall thematic directives, the designers of the 675-seat St. Stephen Roman Catholic Church in Warwick, NY, also wanted to create a building in harmony with its naturalistic site.

"On the exterior, we tried to break up the scale of the building," explained Peter A. Bentel, AIA, a partner with Bentel & Bentel, Locust Valley, NY. In addition to the main worship area, the church includes an assembly area, rectory,



and parish workrooms. In order to make the varied elements of the structure readable from its exterior, the designers created a series of wings topped with different-height peaked roofs. "In appearance, it's almost a cluster of buildings, almost a village," Peter Bentel said.

Creating this village appearance also melded with the parish priest's desires. "He had a special affection for small churches he had visited in Ireland," Peter Bentel said. "Since they only seat about 50 people, we couldn't directly duplicate their look, but the vocabulary of our design is sensitive to those structures." At least on the exterior.

The interior is something completely different, a curious blending of the modern and the traditional, a combination of steel and glass and wood.

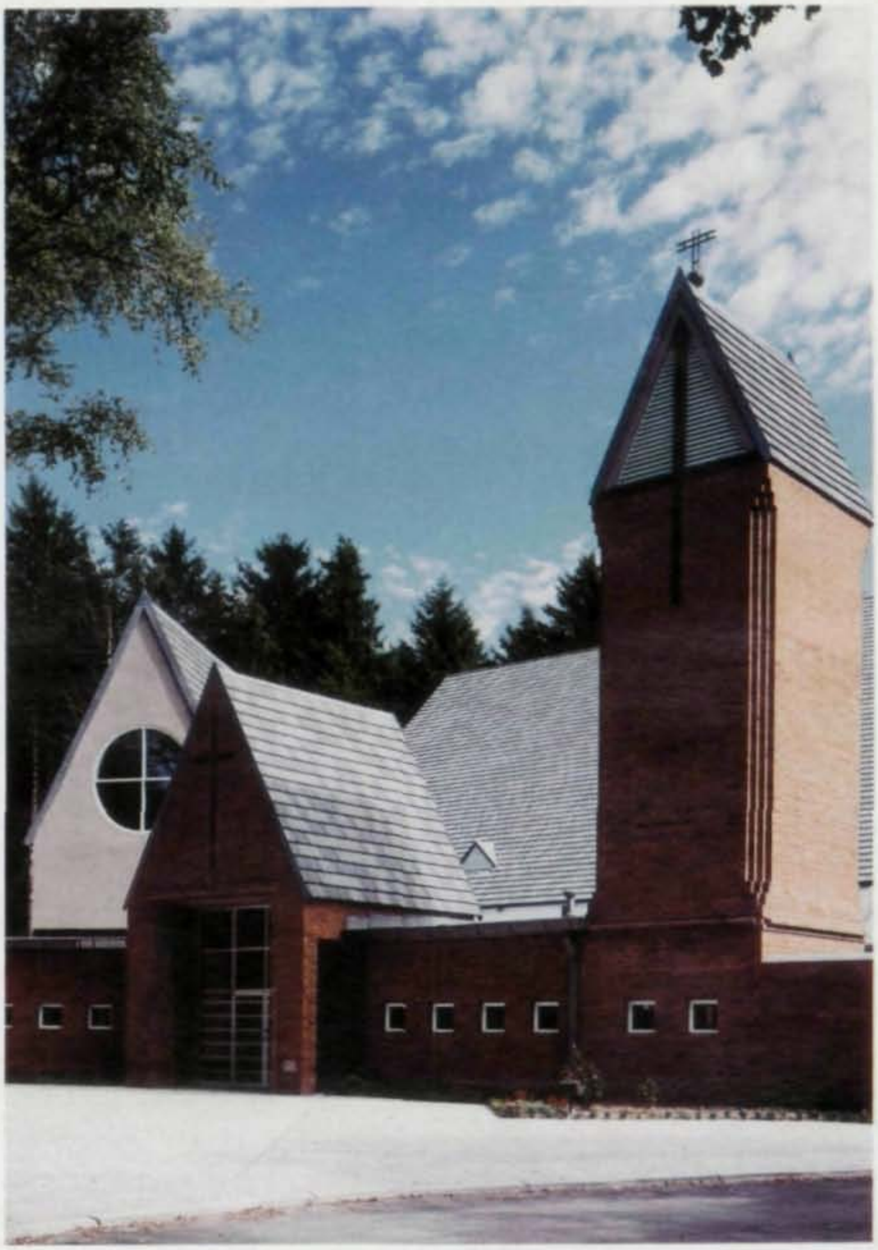
"The site is vaguely triangular, and its most notable feature was a plantation of pine trees arranged all in a row," Peter Bentel said. "These are the only trees in the area, which is primarily rolling farmland. People in the community feel very strongly about these trees, and we wanted to incorporate them into our design."

The first step was to incorporate a lot of glazing—an entire window wall overlooking the grove. But in addition, the designers carried the tree shape into the building in the form of multi-limbed steel columns.

"We considered a variety of materials for the columns," Peter Bentel explained. "Many churches are glue-laminated wood. But we wanted something different, something which would provide a unique identity. Steel also was attractive because it would satisfy the 55'-height requirements without being too bulky." In addition, the use of standard steel shapes allowed the designers to create a unique image while staying within the project's $2 million budget.

The steel trees are composed of standard wide flange sections, with smaller members bolted to the

The use of structural steel framing allowed the designers of St. Stephen Roman Catholic Church in Warwick, NY, to create a unique blend of the natural and the man-made—sculptural steel trees that also are integral to the building's structural system. Photography by Arch Photo /Eduard Hueber



The exterior of the church is designed to resemble a cluster of smaller buildings—almost a village in scale. The different elevations denote separate functions, such as the sanctuary, assembly area, rectory, and parish workrooms. Photos by Arch Photo/Eduard Hueber

main columns. "The interior columns frame into large, sloping steel beams, which frame into a ridge beam," explained Paul L. Bentel, AIA, another partner with Bentel & Bentel. The sloping beams, as well as the ridge beam, are concealed by a wood ceiling deck. "Wherever the steel penetrates the wood deck, we installed steel closure plates to hide the opening." Bolts were chosen instead of welding the steel in order to emphasize that the tree is made up of pieces, rather than being a single piece. "Also, bolting meant no field welding."

The rest of the structure also is

steel framed, with conventional beam-and-column construction. Structural engineer on the project was Joseph Silvestri, P.E., of Baskam & Associates, and general contractor was Barrett Construction & Management, Inc.

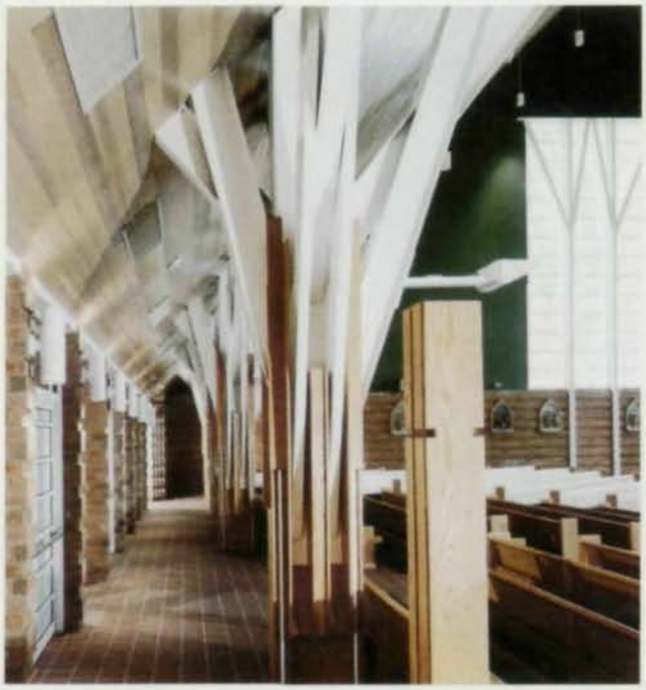
At the far side of the church, over the altar, the roof cantilevers to form an overhang that shades the large glass wall from a fierce summer sun. The curtainwall extends up to the roof, and has a slotted connection to allow some differential movement.

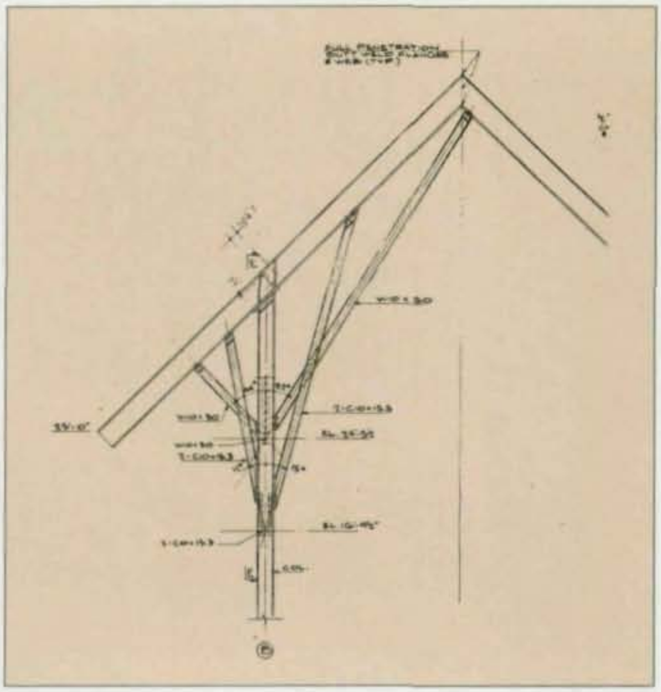
The trunks of the steel tree columns are W18x71s in the corners and W18x97s in the center, while the bracketed arms are W10x30s and C10x15.3s. The ridge beam also is a W18, while the sloping rafters are W24 members.

The steel members are designed so that one of the bracketed arms of the column frames into the roof beam at a 90 degree angle and transfers the load of roof cantilever back into the column.

"One of the reasons the columns are so deep is because it picks up the some of the load from the roof cantilever but we wanted to make it stiff enough not to generate torque in the footing," according to Paul Bentel.

The bases of the trees are deco-





rated with laminated wood to reinforce the natural theme. "Because everyone working on the project knew right from the start that the steel would be exposed, there was a lot of pride taken to ensure that the connections were perfectly detailed," Paul Bentel said.

"The steel was painted white to suppress the industrial notion that a lot of people have of exposed steel," explained Peter Bentel. "A lot of people see the trees as a sculptural shape rather that as a standard steel product." ■

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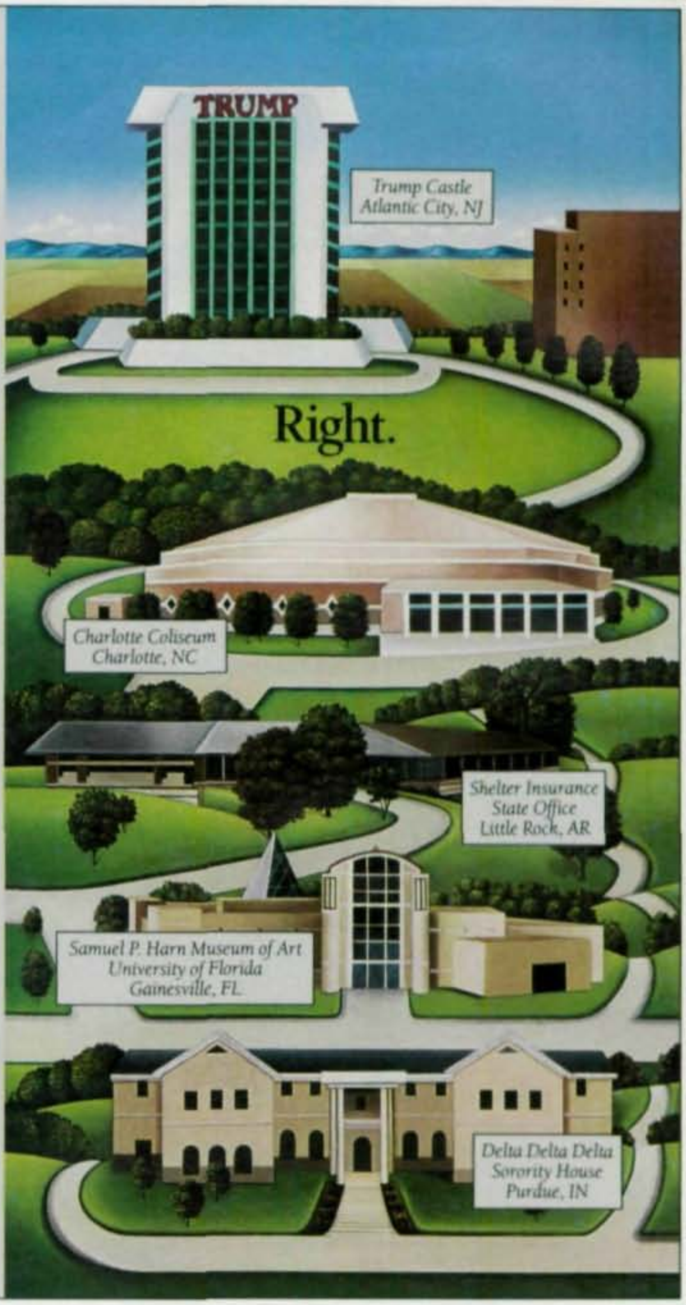

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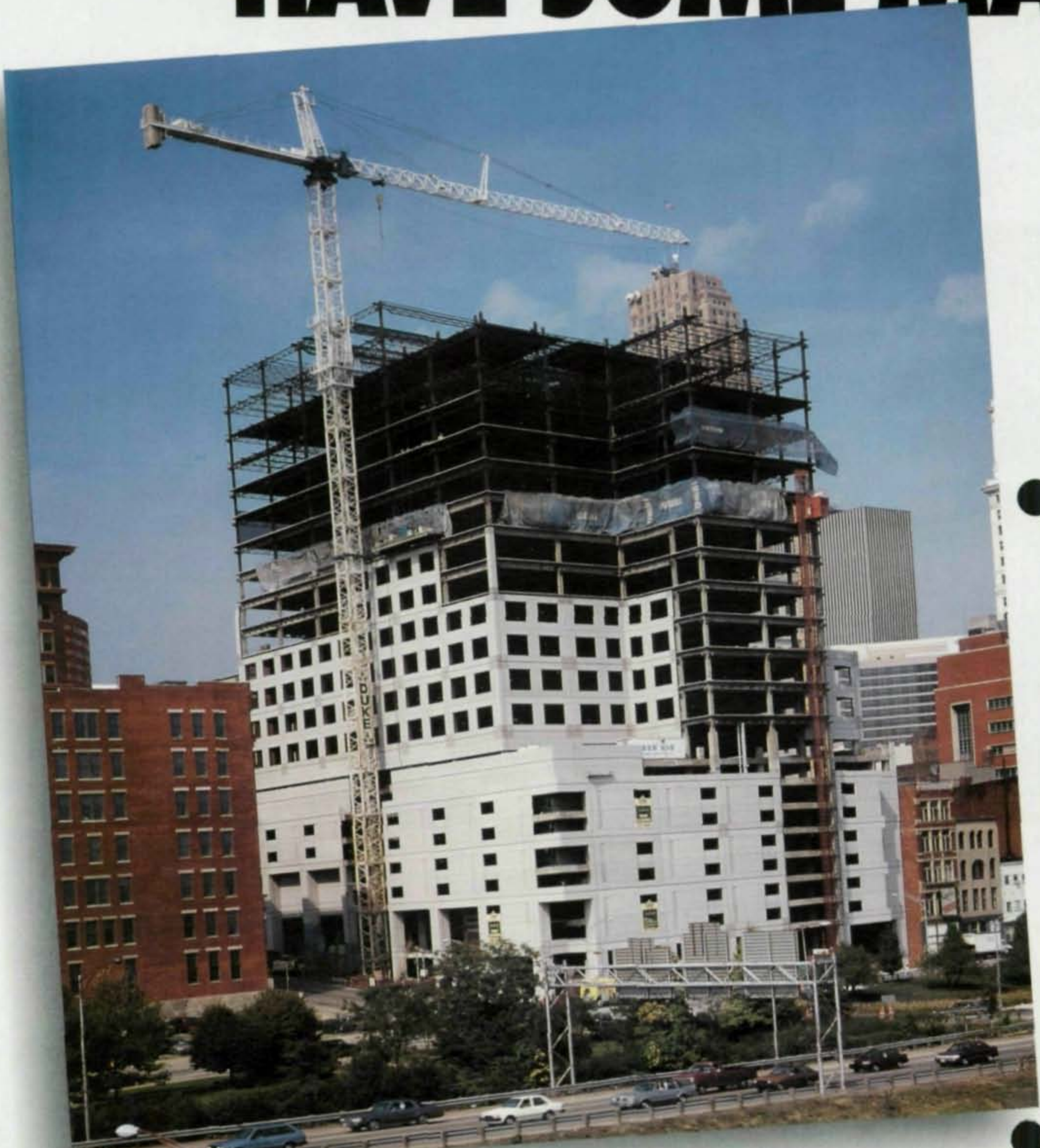

Twenty-six story, 312 Elm Building, Cincinnati.

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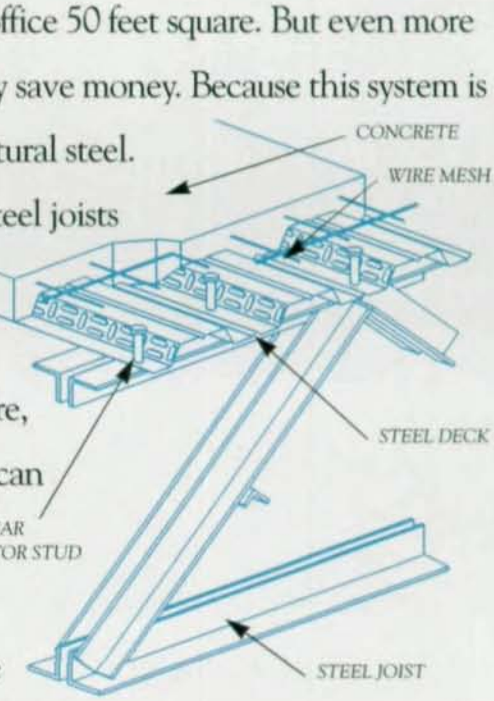

On this job, 2-inch composite deck was attached to steel joists with shear connector studs. Then, 4 1/2 inches of normal weight concrete was poured on the deck. It all makes this system perfect for the popular, longer floor spans. What's more, it minimizes floor-to-floor heights because the MPE systems can run through the webs of the joists.

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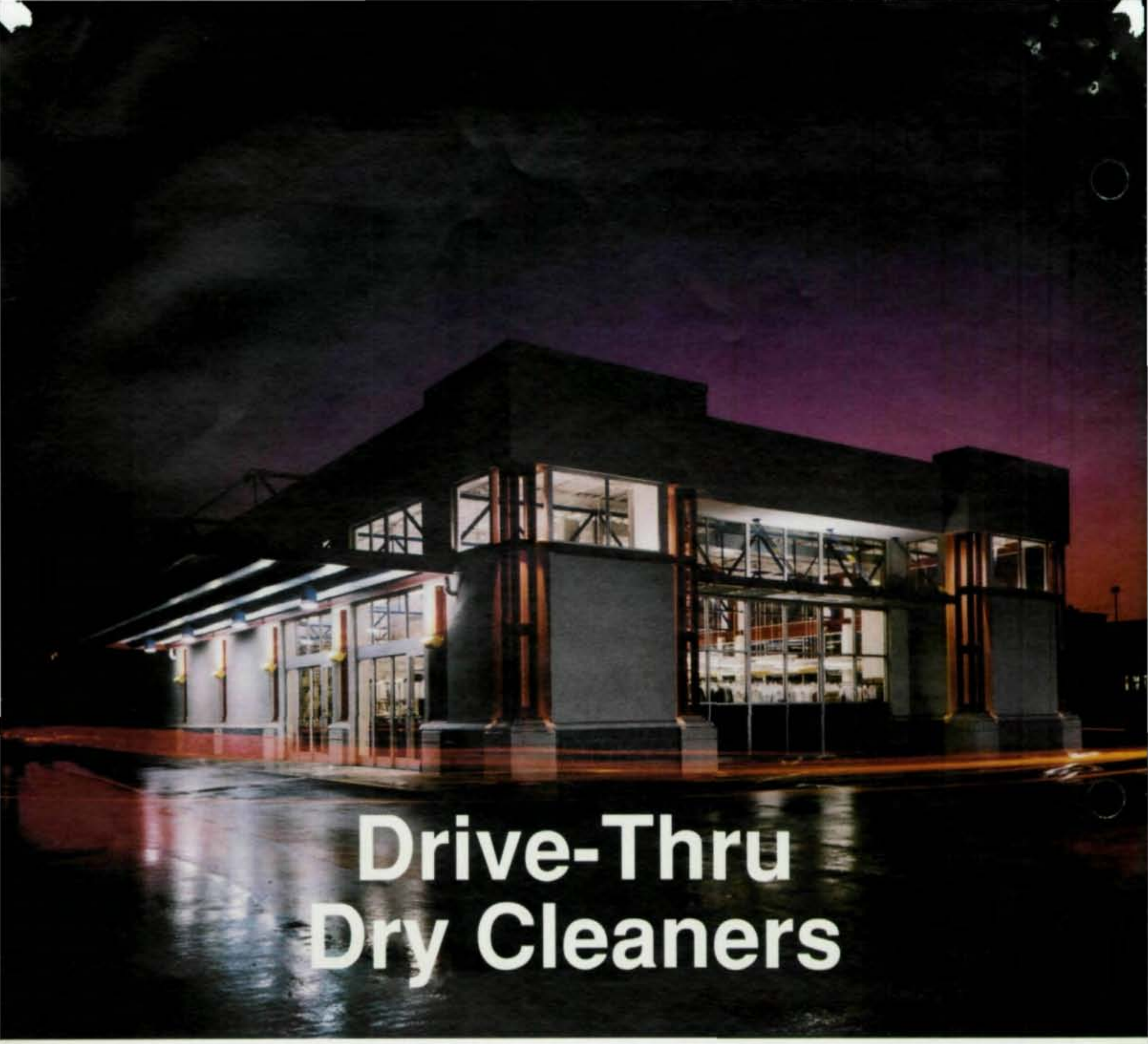


Drive-Thru Dry Cleaners

Glass and steel construction combines with careful lighting to create a beacon to attract customers from nearby highways

While Drive-In Movies may be defunct, car owners—at least those in Memphis—have a new drive-thru option: the cleaners.

The Cannon Company has plans to open a chain of Dryve Cleaners, and has so far opened three stores—two in renovated facilities and their latest in a brand-new, prototype building. "The owner was looking for a design that would accommodate the program for a drive-thru facility, but would also project an eye-catching image," explained Frank Ricks, AIA, a principal with Looney Ricks Kiss Architects, Memphis. "The owner also wanted a somewhat modular building that could easily be adapted to different sites in slightly different sizes. And he wanted us to incorporate his company colors—red and blue—into the design."

From the start, it was clear that this couldn't be an ordinary building. "Right away we began considering architectural forms that would allow us to incorporate primary colors," Ricks said. "That led us to an exposed structure, and steel was the obvious choice aesthetically. Cars are very high-tech, yet still utilitarian. it seemed appropriate to design a building with

Exposed steel plays an integral role in the design of Dryve Cleaners—a prototypical drive-thru cleaners in Memphis. According to the designer, "Cars are very high-tech, yet still utilitarian. It seemed appropriate to design a building with the same philosophy." The exposed steel was economical, yet allowed the designers to capture the corporate colors and create an open architecture that is sure to attract a lot of attention. Photos by Jeffrey Jacobs/Nims Studios

the same philosophy."

An exposed steel structure also allowed the designers to incorporate a large amount of glazing. "We wanted the operations to be visible from the exterior. By using glass and steel, the building itself became a billboard for the store." Particularly impressive is the view of the double-deck conveyor system that transports bundles of clothing to storage areas. While obviously functional, the exposed machinery serves almost as a kinetic sculpture.

Unfortunately, large expanses of glass did have one drawback: excessive heat gain. This was particularly problematic given the nature

While the double-column (above and opposite) was initially designed for architectural reasons, it ultimately proved useful in simplifying the joist girder erection. Essentially, the girders sit on a plate saddle between the two columns. Photos by Jeffrey Jacobs/Nims Studios

of the dry cleaning business, which is very heat intensive. To curtail heat gain, the architects designed a large steel overhang. The canopy maximized natural light entering the building while minimizing heat gain, according to Mike Sullivan, project manager for the architect. In addition, the rear half of the building has masonry walls to shield the messier operations from public view. Also, the canopy serves to protect drivers from inclement weather.

While aesthetically intricate, the structural design of the project is actually very straightforward. On the perimeter are a series of double and triple pipe columns which in turn support lightweight steel truss girders. The roof is supported on steel joists.

While the double pipe columns were initially designed to satisfy the desired architecture, they ended up simplifying the truss supports, according to Tom Robinson, P.E., a structural engineer with Gardner & Howe, PC, Memphis. "We slipped the truss girders between the columns and supported them on two ¾" thick steel plates," Robinson said.

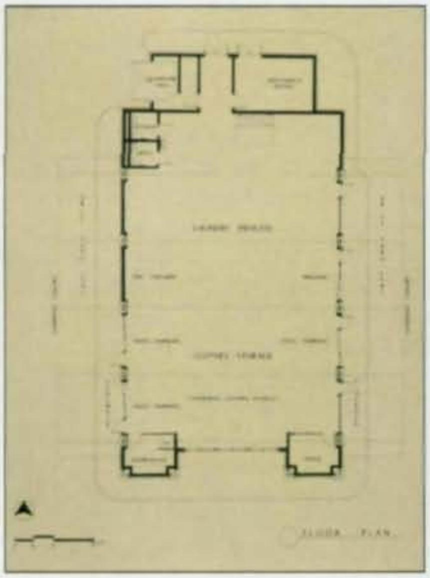
Three pipes were used in the corners of the building to "turn the corner" and visually give the appearance of two pipes on each face. X-bracing using rods and turnbuckles in the roof diaphragm provides lateral support.

The canopies are made up of wide flange sections and are supported by the truss girders, which cantilever out beyond the columns.

Simplified Erection

The double column arrangement also simplified erection, according to Larry Robertson, a principal with Martin Cole Dando Robertson, Memphis, the project's general contractor. "We thought erecting the joist girders would be difficult, but it wasn't. We set them all up in about a day." Total project time was just under six months and project cost was $500,000 (excluding land, furnishings and fees) for the 5,700-sq.-ft. structure.

Lighting was used extensively to



transform the structure almost into a lantern. On the interior, there are both fluorescent downlights and uplights. Behind each of the pipe columns are lighting to emphasize the structure. And, of course, there are downlights beneath the canopy. Behind the double columns are windows, so light emerges from the building and workers get some natural light, even though the view in is obscured.

The well lit, exposed steel structure is highly visible from nearby roadways. The building itself is a signpost for the drive-thru business. ■

Exposed Steel Meets Aesthetic And Cost Requirements

A series of alternating low- and high-bay spaces could most efficiently be framed with structural steel

By Eliot W. Goldstein, AIA

The concept for the new library in Old Bridge, NJ, is a series of alternating low- and high-bay areas, with the low-bay areas housing book collections while the high-bay areas serve as reading rooms. Photos courtesy of James Goldstein & Partners

After just 15 years, the burgeoning community of Old Bridge, NJ, had outgrown its old library. In its place, the town had plans for a building three times larger—and unlike its earlier home—the new structure needed to be designed for future expansions.

The need for flexibility was just one of the factors that influenced the design of the 44,000-sq.-ft. structure. The State Library, which was providing a substantial portion of the construction funding, mandated that the entire structure be on one level. Also, the site was in a Seismic Zone 2, and since the soils in the area consisted mainly of moisture-sensitive silty sands, several feet of engineered fill was required at the site's low end.

While the project's budget was tight, the Library Board, to its great credit, was unwilling to compromise in its functional requirements, which included daylight-filled reading rooms, direct visual control of the entire library by its staff, and a clear building organization. The site was an undeveloped field at the edge of the existing municipal complex. To help the library—which would be larger than all of the other buildings combined—blend in, the building was to be clad with the same red-brown Norman-size brick veneer as these neighboring structures.

The initial organizational diagrams for the library featured clusters of low-ceiling bookstacks—

each housing a single collection such as fiction or reference—alternating with high-ceiling reading rooms. The space between the upper and lower roofs would be glazed, assuring each reading room of ample daylight.

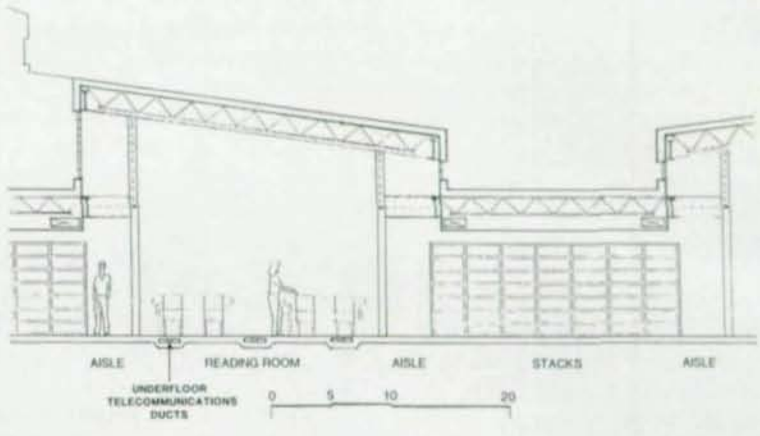
Early in the design process, I had the opportunity to visit Louis Kahn's Kimbell Museum in Fort Worth, TX, and was struck by the spatial variety he achieved through the interplay between a system of repetitive linear roof forms and a simple set of temporary and permanent partitioning devices. The rhythm of alternating low and high roofs at the museum perfectly dovetailed with the initial organizational scheme for the library.

Like the Kimbell, the spaces under the low roofs would house service functions. But unlike the Kimbell, a narrow circulation zone would occur at each interface of low and high spaces. When visitors enter a reading room, they would perceive the close ends of the stacks as a virtual wall along its sides. Then, as a visitor turned and entered a stack room, s/he could look into the next, and beyond that into the next reading room, and so on until the view reaches the landscape, with each space having its own distinct personality.

It was clear that the limited budget could not support an acre of hung ceilings and that the structural system would have to serve both functionally and aesthetically. Given the aesthetic requirements, along with the seismic needs and desired bay sizes, structural steel was the obvious framing material, since neither concrete nor timber could achieve all of our objectives at a reasonable cost. For economy of means, I looked to the great British train sheds, those masterpieces of exposed cast-iron structure.

Form And Function

Libraries, perhaps more so than any other building type, are dimensioned around the specific standards of the furniture they house. The Old Bridge Library was no exception and the length of a section of bookstacks played an essential part in many of our design deci-



SECTION OF TYPICAL BAY

sions. Equally important, however, was the center-to-center spacing of stack rows or ranges—now typically 5′ to accommodate wheelchairs. The owner limited the length of each range to seven sections or 21′. These two dimensions—21′ lengths of bookstacks spaced 5′ on center—became the designer's building blocks.

Comfortable Reading Space

Using detailed study models, we concluded that each reading room should be about 30′ wide. Insofar as the apparent width of the reading room was delimited by the ends of the bookstacks, we arrived at a rhythm of 29′ reading rooms and 21′ bookstacks, totaling 50′ per cycle. Since we desired a virtual corridor at their common edge, we superimposed a column spacing that was intentionally out-of-phases with the library furniture (see diagram below). This set up an overlapping of structures that enhanced the differences in scale between each reading room and its side aisles.

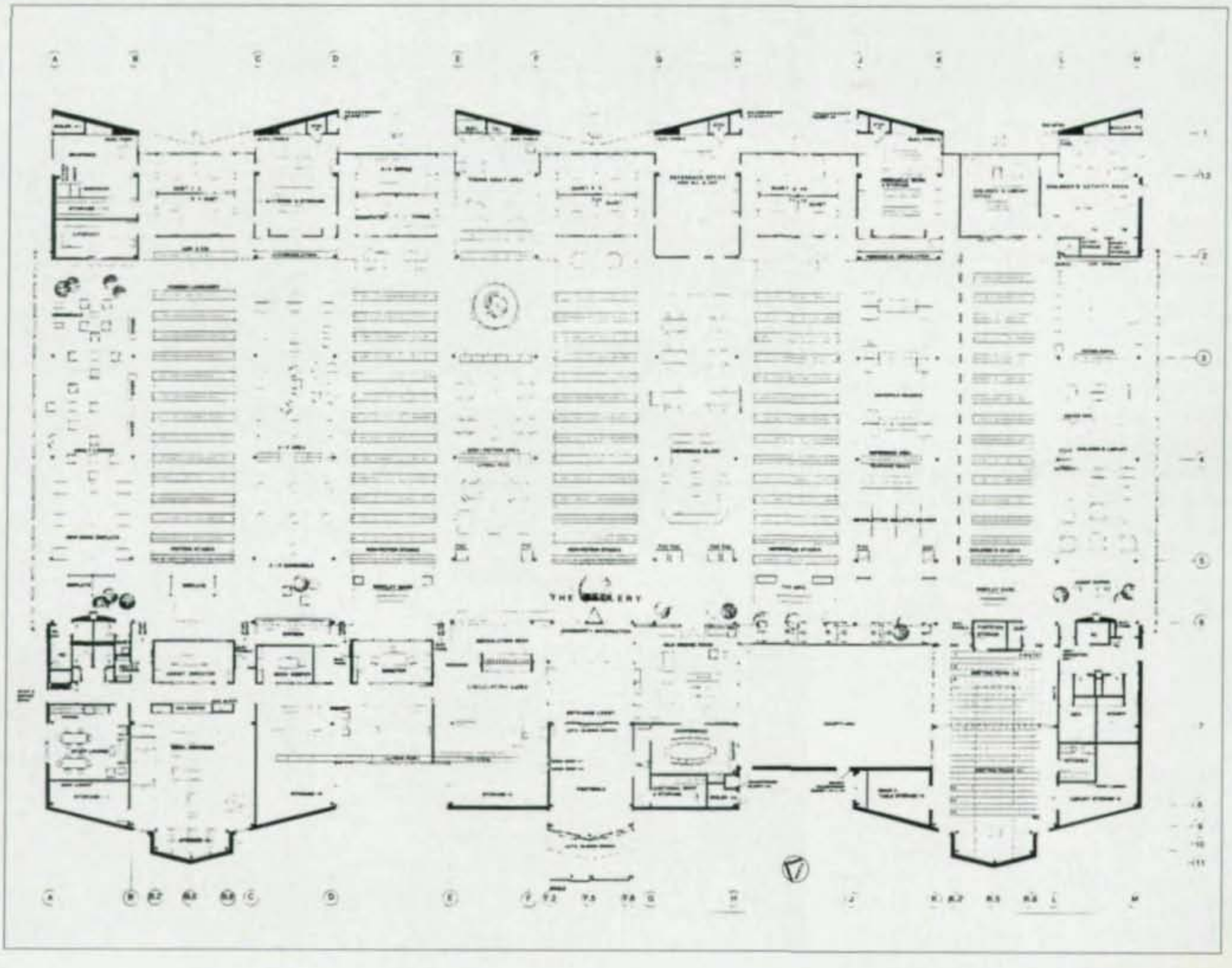
Unfortunately, this also resulted in excessive unbraced lengths of columns in the clerestories between the low and high roofs, and in unbraced lengths of girders at the edges of the low roofs—conditions that created design problems for Severud Associates, New York City, the project's structural engineer.

Fortunately, this problem could be solved within the framework of providing horizontal bracing for the entire structure. Rather than use bulky and expensive moment connections requiring heavy members, a system was developed using lightweight horizontal and vertical diagonal braces in every bay of the clerestories, along with heavier X-braces in the lower end bays, to carry lateral loads to the ground.

As construction neared completion in the Winter of 1992, the area was struck by a small earthquake, but the new library suffered no damage.

Exposed Bracing

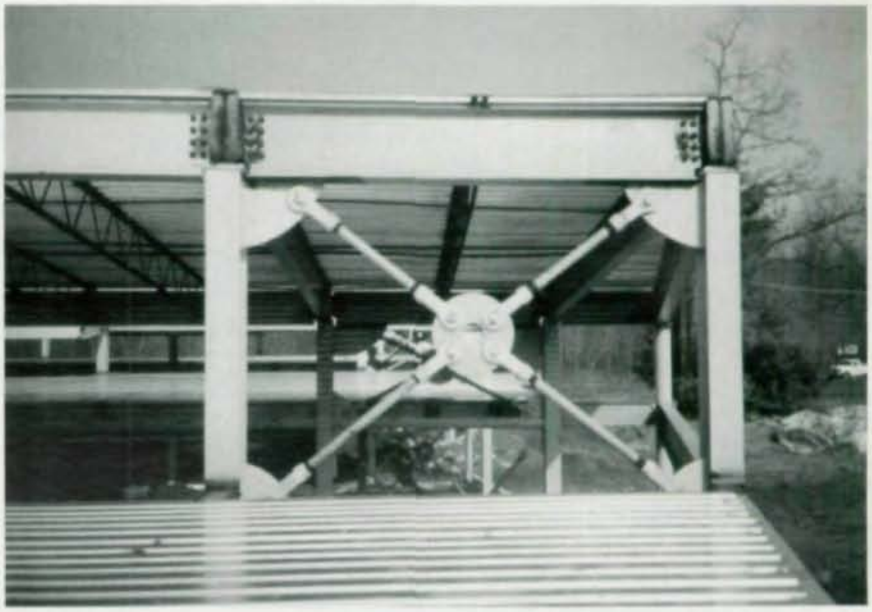
All braces are composed of exposed reverse-threaded steel rods, housed in clevises and tied at mid-span with turnbuckles. Horizontal steel tubes would act simultaneously as longitudinal struts between reading room columns, and as chords of both the horizontal and vertical trusses resulting from the bracing strategy. Structurally, the building consists of W8 x 31 columns, W21 girders, and 18" deep open web steel joists topped with 1½"-thick, 20-gauge metal decking. All of the 280 tons of structural steel is A36, except for a



few pipe columns. In addition, there is 48 tons of steel roof deck and 28 tons of open-web joists.

A variety of lighting sources serves to further differentiate the reading rooms from the bookstacks. Linear fluorescent uplights, programmed to switch off in conditions of adequate daylight, bounce light off the exposed undersides of acoustic metal roof deck in the reading rooms. By contrast, linear downlights over the aisles of the stack rooms illuminate the books.

For all its clarity and simplicity, however, the rhythm we had set up for the conventional library areas could not accommodate the three programmed gathering spaces: the 180-seat meeting room; the staff workroom; and the public lobby. The 20′ width between columns in the reading rooms was too narrow, and while the 30′ spacing



Braces in the building are composed of exposed reverse-threaded steel rods, housed in clevises and tied at mid-span with turnbuckles.

of the columns straddling the bookstacks was perfect, the ceiling in those areas was too low.

To obtain the needed space, we placed the gathering spaces at one end of the building and caused the six reading rooms coalesce, in pairs, into three larger rooms. The opposing roof slopes of each pair of reading rooms meet, creating lofty gables over each space. Separating the reading rooms and bookstacks from the gathering spaces is a circulation spine, or galleria. In the event of a future expansion, the circulation spine and the spaces on either side of it could simply be continued in the pre-established rhythm.

The three gathering spaces are crowned by cupolas framed by a series of small rigid frames composed of W12 x 19s. The side walls of the lobby are dominated by steel X-bracing. Exposed cylindrical ductwork flies through the lobby on its way to adjacent spaces. All power and data wiring runs in a trench duct networked embedded in the concrete slab-on-grade.

Simplified Circulation

On the opposite side of the reading rooms and bookstacks is a secondary circulation spine providing staff access to workrooms and service modules. Terminating each low bay is a cluster of four quiet rooms, enclosed in glass from floor to ceiling, to facilitate monitoring by library personnel.

The building is glazed in high-performance insulating glass coated to maintain a high degree of transparency while yielding a low shading coefficient. With no partitions in the middle two-thirds of the structure, and with continuous clerestory and storefront glazing, the various steel-framed roofs appear to float over the floor, creating a beautiful, yet economical, appearance.

Eliot W. Goldstein, AIA, is a partner with the architectural firm of James Goldstein & Partners, Architects, headquartered in Millburn, NJ.■

Eccentric Braced Frames: Not Just For Seismic Design

A combination of eccentrically braced, concentrically braced and rigid moment resisting steel frames proved most economical for a 26-story Cincinnati office building

By Michael E. Corrin, P.E., and Kurt D. Swensson, Ph.D., P.E.

The latest addition to Cincinnati's skyline is a 736,000 sq. ft. office building and parking garage complex rising 26 floors above the Ohio River Valley across from famed Riverfront Stadium. The project consists of a 10 level parking garage supporting 326,000 sq. ft. of office space on 16 floors.

While approximately $60 million and a 16 month construction time was budgeted, an innovative framing concept cut 4% from the project cost and five weeks from the project schedule.

Economical Framing

Several structural schemes were investigated in detail to determine which would provide the owner,

312 Elm Frame Comparisons	Option A	Option B	Option C	Option D	Option E
Cost per sq. ft.	$14.72	$14.66	$13.89	$13.83	$14.22
Total Duration (weeks)	56	56	56	56	61

OPTIONS:
A: Cast in place garage w/composite joist system; composite braced steel office tower; lw concrete
B: Cast in place garage w/composite joist system; composite braced steel office tower; nw concrete—sprayed deck
C: Cast in place garage w/composite joist system; steel braced office tower; lw concrete
D: Cast in place garage w/composite joist system; steel braced office tower; nw concrete—sprayed deck
E: Cast in place garage; post tensioned cast in place office tower

The framing system for 312 Elm in Cincinnati was selected both to minimize costs and maximize flexibility.

Duke Associates, with the best value based on cost per sq. ft., scheduling, and flexibility. Also taken into consideration was the owner's firm desire for clear, open leasable space.

In a cost comparison between several post-tensioned cast-in-place systems and structural steel schemes, the most economical system proved to be a 10-level post-tensioned cast-in-place parking garage below a 16-level steel-framed tower.

The selected steel framing system consists of a normal weight concrete composite floor supported by composite steel joists spanning 48½' from the center core to the exterior. The joists, in turn, are supported by a combination of wide flange girders and trusses. Due to load considerations, A572 Grade 50 steel was used on the lower five floors of the office portion of the project, while A36 was used on the upper levels. In a comparison of lateral load resisting systems, a combination of eccentrically braced, concentrically braced and rigid moment resisting steel frames proved to be the most economic solution.

The final scheme resulted in a total structural cost of $13.83 per sq. ft., including all fireproofing, compared to $14.22 for an all-concrete structure—a savings of more than $280,000, part of which were savings in miscellaneous metal costs and in the lateral load resisting systems. In addition, there were savings attributable to steel's lighter weight, which reduced foundation and garage column costs. Also, the construction schedule for the steel office tower scheme required a 56-week schedule compared to the 61-week duration anticipated with an all-concrete scheme.

Combined Systems Provide Lateral Stiffness

The geometry of the structure, along with the desire for a long-span, thin-floor structure, dictated that the majority of the lateral loads from the 80 mph design wind speed be resisted in the core area. However, preliminary analysis of the building indicated that if moment resisting frames were used along the core, they would require significant stiffening due primarily to the wide 30' spacing of the columns. Instead, the decision was made to investigate a braced frame in these locations to reduce drift. However, as is often the case, other building requirements—such as stair and elevator lobby exits—precluded the use of concentric braces in certain locations. Instead, the designers opted for a combination of concentric and eccentric braced frames.

A series of four concentric braced frames across the core resists the lateral forces against the long 235' face of the building. Lateral loads against the short 125' face of the building are resisted by two 3-bay eccentrically braced frames located along each side of the core. Using eccentric braces allowed for the architectural functions and provided significant stiffness to the frames. The final configuration included eccentric braces in two of the three bays and significantly reduced the drift associated with the frames while also reducing their cost. Architect on the project was Space Design International, Cincinnati.

Since this project is not located in a seismically active area, the extra ductility requirements usually associated with eccentric braced frame links (see last month's *MSC*) were not a consideration. Links, braces and all connections were designed to resist the calculated forces only. Therefore, no increase in design values was necessary to insure against a ductile failure in the link.

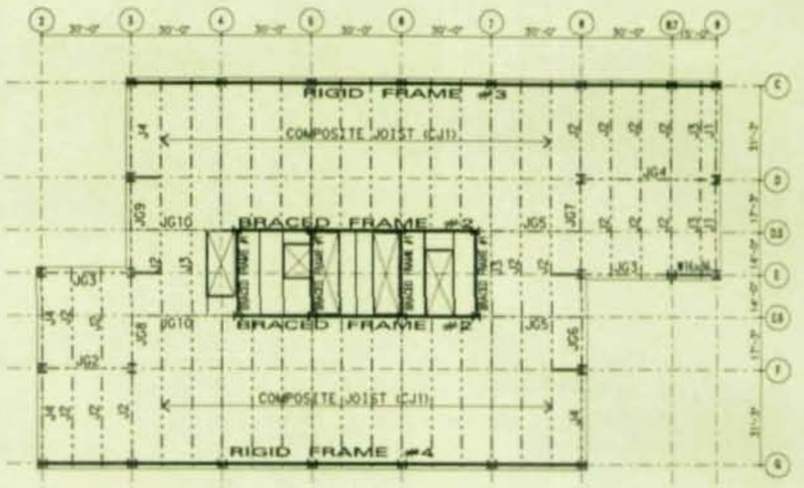
The initial three-dimensional analysis using the University of California-Berkeley's COMBAT software and the results of a wind tunnel analysis indicated that the structure would be highly susceptible to torsional effects. Several options for providing additional torsional resistance were evaluated with the most economical system being to create moment resisting frames along the 235′ sides of the building by utilizing the inherent stiffness of the standard perimeter truss girders required for gravity loads.

These truss frames worked very well to minimize the torsional effects while adding very little cost to the structural frame. The moment resisting frames were developed by simply mobilizing the stiffness of the truss girders through the addition of moment connections.

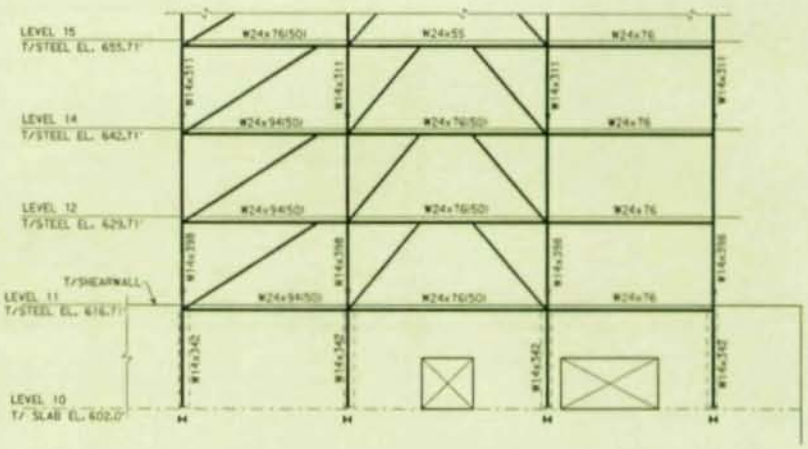
The lateral loads from the various frames in the office towers were transferred to concrete shear walls in the parking garage. Forces form the braced frames were transferred directly to the shear walls through a transition zone between the 10th and 11th levels with headed studs placed in a confined reinforced concrete core within the shear walls.

Maximizing Flexibility

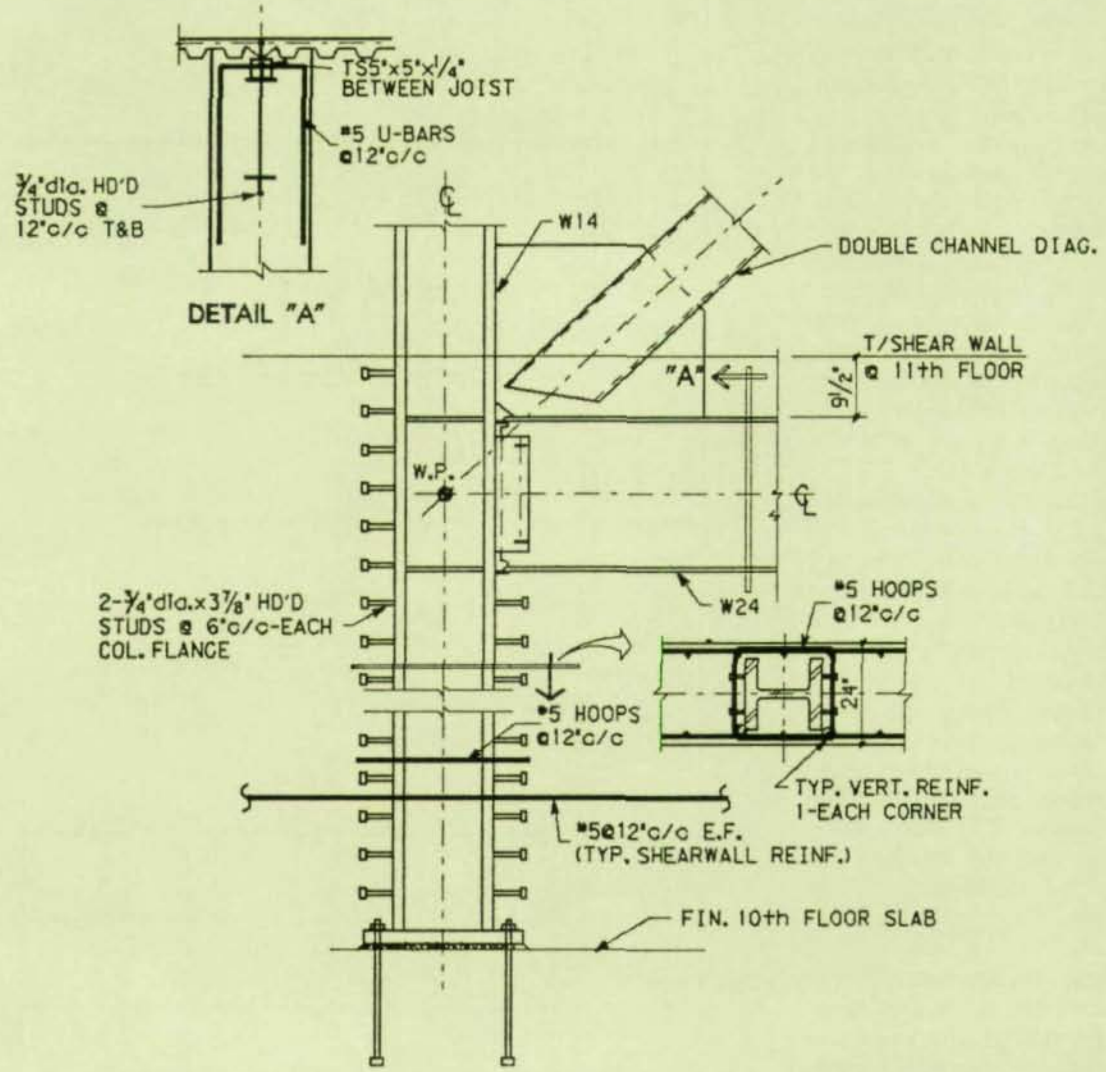
To provide a serviceable framing system without adding significant height and cost to the building, and to allow for open, usable space in the 48′ area between the core and the perimeter, a compos-



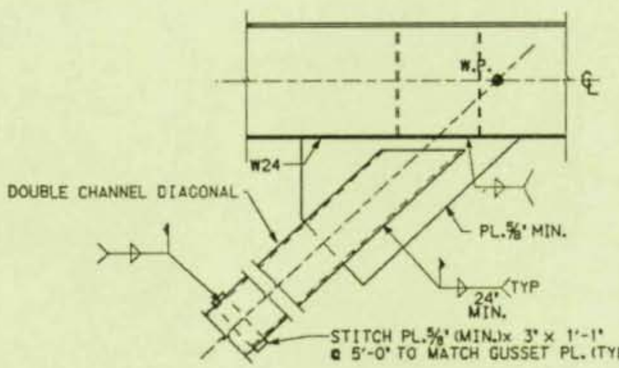
OFFICE LEVEL 18 – 26 FRAMING PLAN



ECCENTRIC BRACED FRAME #2



ECCENTRIC BRACED FRAME CONNECTION DETAIL



ECCENTRIC BRACED FRAME CONNECTION DETAIL

ite joist system was selected. The joist system was designed using LRFD methods and utilized 55 ksi grade bottom steel chords. After conducting a cost comparison, a 4½" normal weight concrete slab on 2" composite deck was chosen.

The 32"-deep composite joists and deck were both fireproofed with a spray-on fire protection system from Isolatek International in accordance with UL #N825.

The primary advantage of the joists is the ability to provide maximum spans with minimum floor-to-floor heights. Sleeving the piping and ductwork through the joist webs within the 32" depth allows a 48' span in a 12'-6" floor-to-floor height. Constructability of the joist system also was excellent, and during construction there were very few interferences between the joists and pipelines.

To provide even greater flexibility, the top chord shear studs as well as the web members were designed to accommodate the future location of libraries and various storage areas wherever tenants may desire them. During tenant work, specific areas of the floors can be strengthened by merely welding steel plates to the bottom chord of the affected joists. This design provision has proven to be of tremendous benefit at minimal additional cost to the owner.

A light welded wire fabric was used in the slab to control shrinkage cracking. A fiber mesh substitution was considered as a cost savings measure, but none of the composite joist systems nor the deck systems had been tested without the welded wire fabric. Therefore, the decision was made not to use a fiber mesh alternate.

Allaying Serviceability Concerns

Many owners are very concerned about floor vibrations, especially in long-span projects such as this one. Thus, it was critical to analyze the vibrational behavior of the floor system as part of the design process.

An individual composite joist had a frequency of 4.27 hz and a maximum amplitude of 0.0077". The entire floor system was calculated to have an initial natural frequency of 3.59 hz with an amplitude of 0.0119". By plotting this information on the modified Reicher-Meister Scale, the floor is within the "slightly perceptible" range, which is considered acceptable by industry standards for typical office applications. And after construction was complete, the actual vibrations of the floor system were found to be even less than anticipated.

The project contains approximately 1,150 tons of structural steel, 1,400 tons of joists and joist girders, 2,400 tons of reinforcing steel, 30,000 cubic yards of concrete and 130,000 sq. ft. of precast concrete cladding. Structural steel fabricator was AISC-member Ferguson Steel Company, Inc., Indianapolis, and general contractor was Duke Construction Management, Inc., Cincinnati. Structural engineer was Stanley D. Lindsey and Associates, Ltd., Altanta.

The use of structural steel in innovative solutions such as the composite joist floor system and the eccentric braced frame, along with the interaction and cooperation between all team members, allowed the project to run smoothly, ahead of schedule, and under budget.

Michael E. Corrin, P.E., and Kurt D. Swensson, Ph.D., P.E., are project engineers with the structural engineering firm of Stanley D. Lindsey and Associates, Ltd., in Atlanta. ■

An added benefit of the selected framing system was the rapid, 56-day erection period.

Steel Detailing

Mountain Enterprises has released Version 3.2 of its ME2 Steel Detailing System. The software produces finished details from erection drawings, built with easy on-screen menu choices, by direct entry of individual members, or by a mixture of both methods on any project. All programs are mouse-based for ease of data entry. building and connection geometry is fully automated and connection design is automatic and customizable. Even if the engineer has pre-designed his required connections, these can be automated and become part of the system.

The new version offers: a greater variety of already-computerized connection types; compatibility with Windows 3.1; high-resolution, full-color VGA graphics (with or without Windows); an expanded data base; and a fast, easy-to-learn CAD that can be as "parametric" as the detailer needs.

For more information, call Mountain Enterprises at (304) 876-4845.

Frame Analysis

ECOM Associates, Inc., has released dynamic analysis modules for both its FA3C General Frame Analysis program and FA7C CSTRAAD Finite Element Analysis program. The Dynamic Analysis module is full featured and calculates mode shapes and frequencies, and response history along with spectrum analysis. Loads may be input as either time varying loads or as general ground motion. Response history can be done by either modal superposition or by direct integration. This software, along with the rest of ECOM's SES library, is available on either DOS or UNIX platforms.

For more information, contact: ECOM Associates, Inc., 8324 N. Steven Road, Milwaukee, WI 53223 (414) 365-2100.

Metric Detailing

Computer Detailing Corporation has released its metric version of its Beams and Columns and its Plans and Elevations software. These programs, which run under AutoCAD, are for detailing structural and miscellaneous metal and for the creation of Erection or Framing Plans. The American and Canadian metric data bases are accessible in a soft conversion, with standard dimensions rounded off and modified to standard metric values. Version 4.5 also has numerous improvements which also will be incorporated into the feet & inches version scheduled for release in October.

For more information, contact: Computer Detailing Corporation, 1310 Industrial Blvd., Southampton, PA 18966 (215) 355-6003.

Joist Catalog

Canam Steel Corporation has published a new 76-page catalog for architects, structural engineers, and Div. 05210 specifiers. The booklet contains standard specifications and load tables for steel joists and joist girders.

For more information, contact: Canam Steel, Sales Manager, 2000 W. Main St., Washington, MO 63090 (314) 239-6716.

Fabrication & Detailing

AutoSD, Inc., a registered developer with AUTODESK, has updated its STEEL DETAILING program to be compatible with AutoCAD Release 12, while still running in Release 9, 10, and 11. The product includes more than 130 different LISP programs for quickly detailing beams, columns, braces, stairs, gusset plates, stair rails and sections on both large and small jobs. Blocks, cuts, minus dimensions, and bolts are calculated for the user from a database of AISC shapes. The bracing program designs and draws braces and gusset plates in minutes. Also available is a set of stand alone calculator programs ideal for the checker or detailer.

For more information, contact: AutoSD, Inc., 4033 59 Place, Meridian, MS 39307 (601) 693-4729.

Torque Controlling Nuts

Nova-Hex nuts allow users to apply precise torque control and bolt assemblies using the Nova-Hex ball socket and ordinary driving tools—anything from air or electric impact drivers to hand operated, ratchet drives. Torque is controlled by the Nova-Hex ball socket, not the driving tool. The new nuts are defined by seven identical tangent circles. The hex shape thus formed is characterized by six protruding lobes. These lobes provide the driving flanks for all types of hex nut tooling. Torque control is provided by means of a precise system of metal re-formation through the nut lobes.

For more information, contact: Fairchild Fastener Group, Once Civic Plaza, Suite 500, Carson, CA 90745 (310) 522-0700; FAX (310) 522-7199.

C-Size Desktop Plotter

Summagraphics Corporation has introduced the latest in its line of Houston Instrument JetPro Series of professional, C-size desktop plotters. The new Model V50, priced at $1,995, gives architects, engineers and other designers a lower cost desktop plotter solution to their CAD and other document needs. The plotter offers users the dual capability of a high quality C-size plotter that can output DM/PL, HP-GL, and HP-GL/2 plot files at 360 dip in five minutes or less and a large document output device that emulates the IBM Proprinter XL24. It also offers AutoScale and Replot features.

For more information, contact:

Summagraphics Corp., 8500 Cameron Road, Austin, TX 78753 (512) 835-0900.

Fabrication Production

Fab/Trol Systems, Inc., has unveiled the new 4.0 Version of the Fab/Trol Estimating and Production Software for metal fabricators. The new program emulates a Windows-style interface with mouse controls and event-driven logic, yet it runs in text mode. The result is a program that provides the functionality of a Windows product without suffering from the performance cost of a standard graphical product.

For more information, contact: Fab/Trol Systems, Inc., P.O. Box 7064, Eugene, OR 97401 (503) 485-4719; FAX (503) 485-4302.

Steel Galvanizing

The American Galvanizers Association has published a specifier's guide to galvanizing for bridge and highway applications. The economics of galvanizing are reviewed in this free book for bridge and highway specification professionals. Also included is an overview of successful projects during the past three decades.

For more information, contact: The American Galvanizers Association, 315 S. Patrick St., Suite 302, Alexandria, VA 22314 (800) 468-7732.

Automated Production Control

Steel Solutions has introduced two new products in its Steel 2000 management program for steel fabricators and service centers. The *Automated Production Control* module allows the fabricator to control all of his cutting lists and CNC machinery directly from one source of information. This eliminates the redundancy of re-inputting the piece mark information for CNC tool programming. The *International* version opens up the power of Steel 2000 to fabricators world-wide. It also allows users to participate in the international bidding and construction market using shapes, sizes and units of measure that correspond to the standards of different construction codes and material suppliers.

For more information, contact: Steel Solutions, Inc., 2260 Flowood Dr., P.O. Box 1128, Jackson, MS 39215 (601) 932-2760; FAX (601) 939-9359.

CAD Upgrade

ISICAD, Inc., is offering AutoCAD users the chance to trade-up from their existing CAD package to CADVANCE for Windows. Current AutoCAD, Intergraph Microstation 3.0+, and Cadkey 3.5+ users can show proof of purchase of a competitive CAD program and purchase CADVANCE for $395, one-fifth of the new $1,995 list price. This new version of CADVANCE includes the ability to directly read and write AutoCAD .DWG files.

For more information, contact: ISICAD, Inc., 1920 West Corporate Way, P.O. Box 61022, Anaheim, CA 92803-6122 (714) 533-8910; FAX (714) 533-8642.

Polyurethane Enamel

Tenemec Co., Inc., has introduced its Series 75 Endura-Shield, a semi-gloss, high-build aliphatic polyurethane enamel that conforms with air pollution regulations. This fast-drying, high-performance coating is highly resistant to abrasion, corrosive fumes and chemical contact. Series 75 can be applied in a single coat with compatible primers to meet fast track scheduling and provide lower overall costs.

For more information, contact: Tnemec Co., Inc., 6800 Corporate Dr., Kansas City, MO 64120-1372 (816) 483-3400; FAX (816) 483-1251.

Construction Management

Armor Systems has introduced PREMIER, a comprehensive, fully integrated accounting system with full construction management capabilities. Designed around a modular concept, the user has the opportunity to activate parts of the system such as Billing, Job Cost, Purchase Orders, Accounts Receivable, Accounts Payable, General Ledger, Inventory, Payroll, and several others.

For more information, contact: Armor Systems, Inc., 324 N. Orlando Ave., Maitland, FL 32751 (407) 629-0753; FAX (407) 629-1401.

Metric Building Analysis

Ram Analysis has released RAMSTEEL Version 2.1, which includes support for both English and SI units and provides designs based on American or foreign steel shapes or user-defined built-up shapes. The program automates the design of an entire floor framing system. Graphical modeling capabilities allows the user to create a model of the entire structure, including member locations, slab properties, floor loads and story data. From this database, the interaction of members, the distribution of loads, and the Live Load reduction factors are automatically determined based on the appropriate building code (BOCA, SBC, or UBC), and moments, stresses, and deflections are calculated and the members optimally sized according to AISC code requirements (ASD 8th or 9th Editions or LRFD).

For more information, contact: Gus Bergsma, P.E., Ram Analysis, 55 Independence Circle #201, Chico, CA 95926 (916) 895-1402.

Automated Storage

Shepard Niles Inc. has published a new case study demonstrating the automated storage and retrieval of 16½' long floor covering rolls in a 17' aisle, using a combination of gravity feed, AS/RS and conveyor technology.

For more information, contact: Howard E. Shumway, Shepard Niles Inc., N. Genesee St., Montour Falls, NY 14865 (607) 535-7111; FAX (607) 535-7323.

Steel Detailing Calculator

Northridge Engineering Software has introduced a new Calculator Program that performs 11 of the most common calculations for steel detailers and checkers. Included are: creating bolt lists and bolt summaries; solving right and oblique triangles; calculating the camber of a beam or truss; solving circles and arcs; designing gusset plates; designing connections in tension and shear; viewing dimension properties of steel shapes; designing splices for "W" shapes; designing beam connections using clips, shear end plates, seats or wing plates; and calculating end reaction, tension, compression, moment, and web crippling.

For more information, contact: NES, Inc., at (800) 637-1677.

Estimating

Software Shop Systems has introduced a new version of its general purpose estimating package, ACE-CSI 1.12. Features include an electronic search function for quickly finding components and a new background save feature that allows estimators to take off items without posting them directly to the audit trail, thereby speeding up the take-off process.

For more information, contact: Software Shop Systems at (800) 554-9865.

Project Management

Welcom Software Technology has released Open Plan 4.0, a major upgrade to the company's project management software package. The release features a new graphical interface, new screen editor, support for PostScript, and additional standard reports, as well as more standard code fields. Open Plan 4.0 allows scheduling of up to 10,000 activities and 256 calendars. It includes 75 standard reports and also allows users to create customized charts.

For more information, contact: Mike Smith, Welcom Software Technology, 15995 North Barkers Landing #275, Houston, TX 77079 (713) 558-0514.

CNC Drilling/Tapping Machine

Compustep Products has announced an important new feature for the Quickdrill SST, wide area (60" x 60"), CNC drilling/tapping machine—a variable speed drive. The addition of a variable speed drive will allow faster, easier drilling.

For more information, contact: Compustep Products Corp., 774 Rye St., Unit 11, Peterborough, Ontario, CANADA K9J 6W9 (705) 745-2961.

Ironworker & Punch Press

Fab Center Sales has introduced two new models of Metal Muncher ironworker and punch press. Models MM-90 and GB-90 are rated at 90 tons on the front press cylinder. The machines replace models MM-86 and GB-86, which were rated at 86 tons, but have no price increase. The new machines are designed for durability and versatility and feature a wide range of options.

For more information, contact: Sales Dept., Fab Center Sales, Div. of Center Eng. Co., Inc., P.O. Box 192, Clay Center, KS 67432-0192 (800) 235-6307.

Grinding Wheels

Norton Co.'s new NorZon 4 grinding wheels perform from 5½ to 7 times better than similarly rated aluminum oxide wheels. The new wheels are available in 7"x¼" and 9"x¼" maxi-discs and 7" and 9" pipe notchers.

For more information, contact: Barry Cole, Norton Co., at (508) 795-5709.

Project Management

Harper and Shuman have released MICRO/CFMS Version 10, a financial management software package for architectural, engineering and consulting firms. The release features a new interface design, expanded file maintenance, and enhanced support.

For more information, contact: Bernie Buelow, Harper and Shuman, 68 Moulton St., Cambridge, MA 02138 (617) 492-4410.

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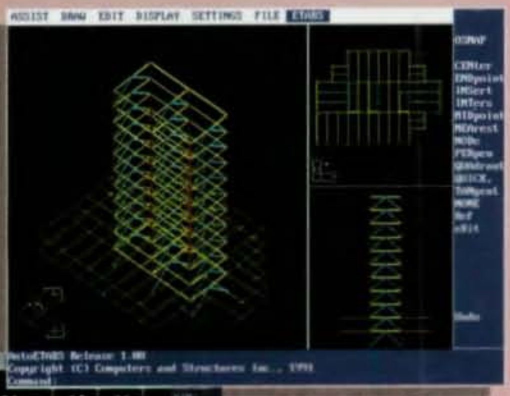

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AutoETABS® - Structural Modeler for ETABS

This model generator is primarily for drawing and editing an ETABS model using AutoCAD. Additionally, this model information is directly available from the database for creating framing plans and elevations with AutoCAD. This scheme allows the draftsperson and the engineer to share common design information without duplication. Many data preparation steps associated with the ETABS model generation are also automated.

AutoFLOOR™ - Structural Steel Floor Modeler for ETABS

This program allows the automated analysis, design, optimization and drafting of structural steel floor framing systems of arbitrary configurations and loading. The program operates upon the entire floor framing system, distributing gravity loads to the various beams and girders as determined by the direction of the decking. The tributary areas and associated live load reductions are automatically computed. Composite and non-composite design options are available for ASD and LRFD specifications. Beam camber and vibrational characteristics are evaluated. Material quantity takeoff tables are also produced.

AutoFLOOR is closely interfaced with AutoETABS. The modules share information that automates the tedious task of transferring tributary floor vertical loads to the columns and girders of the ETABS model.

For more information:

Computers & Structures, Inc.
1995 University Avenue
Berkeley, California 94704

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