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MODERN STEEL CONSTRUCTION

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MODERN STEEL CONSTRUCTION

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VOLUME VI / NUMBER 2 / SECOND QUARTER 1966

CONTENTS

AISC AWARDS FOUR FELLOWSHIPS

Four engineering students have been named as winners of $2,500 research fellowships sponsored by the American Institute of Steel Construction. The awards were made on the basis of choice of research project, undergraduate performance, and the recommendation of college authorities. This program, one of the few offering fellowships in structural research, is designed to encourage research in the field of structural engineering.

James S. Caldwell of Dunbar, West Virginia, will investigate the problem of Behavior and Economics of an Orthotropic Plate Having a Lower Diaphragm Instead of Lateral Beams. He will undertake his study at West Virginia University, Morgantown, West Virginia.

Edward T. Foster, Jr. of Berkeley, California, will investigate the topic of Statistical Characteristics of Wave-Induced Stresses in Off-Shore Tower Structures. He will conduct his investigation at the University of California, Berkeley, where he is now a senior.

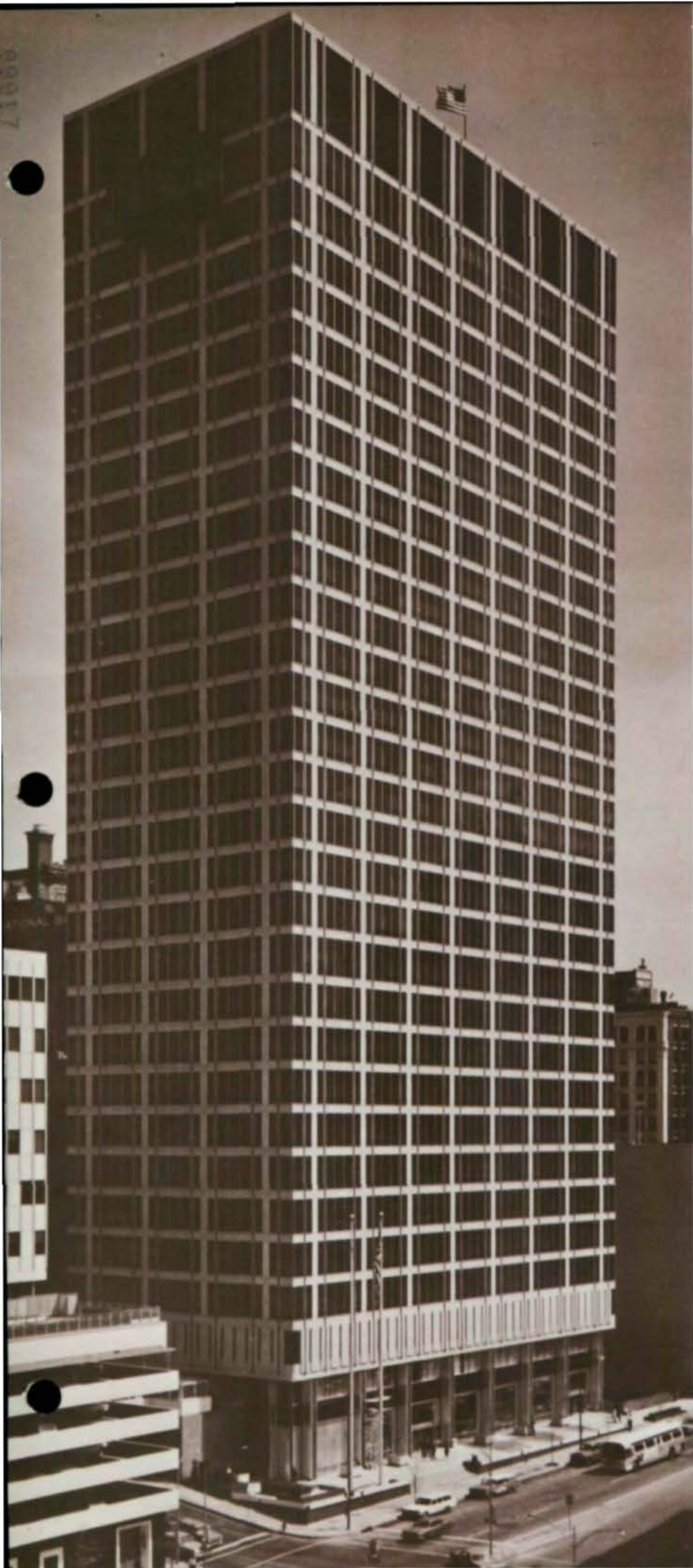
Lawrence M. Pietrzak of Detroit, Michigan, will conduct a study of Computer-Aided Plastic Design. A senior at Massachusetts Institute of Technology, he will continue his studies at that University.

Dwight D. Zeck of Madison, Wisconsin will investigate Dynamic Stability in an Elastic Structural System. He will conduct his studies at the University of Wisconsin, Madison, Wisconsin, where he is a senior.

The Institute plans to make additional Fellowship Awards annually on a continuing basis.

1966 PRIZE BRIDGE COMPETITION

Entries are invited for AISC's 38th Annual Prize Bridge Competition. Steel bridges of all kinds are eligible provided they are located in the U. S. and were opened to traffic during 1965. Entries must be postmarked prior to September 5, 1966.



KC's NEW LANDMARK

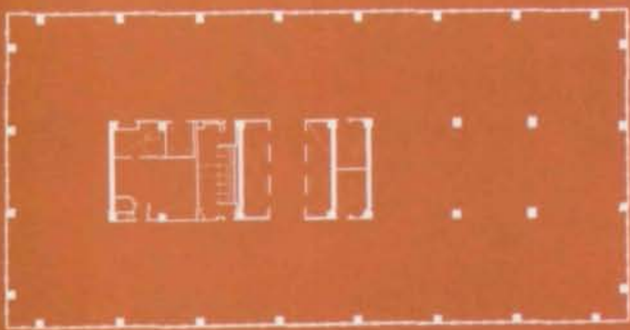
The largest commercial building in the State of Missouri and one of the most exciting new buildings in America today is the 32-story Commerce Tower. Soaring 421 ft above street level, the new Tower is the dominant landmark of Kansas City's rejuvenated downtown northside business district.

Designed on a 4 ft-8 in. module, the building contains 542,800 sq ft of floor area, including two stories below street level, and provides approximately 13,500 sq ft of tenant space per floor.

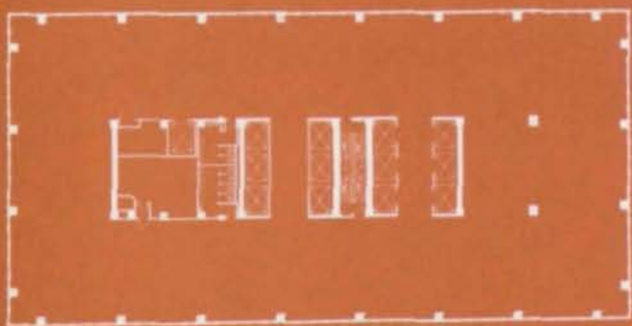
Architectural Features

A landscaped plaza of more than 7,000 sq ft creates a graceful base for the Tower structure. The plaza is paved with pink granite which continues through the glass walls into the lobby and banking areas at street level. A small sunken garden, one level below the street, features a beautiful fountain executed by George Tsutakawa, a sculptor from Seattle. The garden opens from a lower public arcade and is faced on two sides by the Garden Gallery, an area devoted to light continental luncheons or cocktails and for the display of much of the Commerce Trust Company's collection of contemporary American paintings and sculpture.

The main lobby and banking area, with Eleanor Le Maire Associates of New York as interior design consultants, features the world's largest stoneware mural, a bold and colorful composition created by Carl-Harry Stalhane of Sweden.



FLOOR PLAN—UPPER TOWER FLOOR
13,790 Sq. Ft. Useable Tenant Space



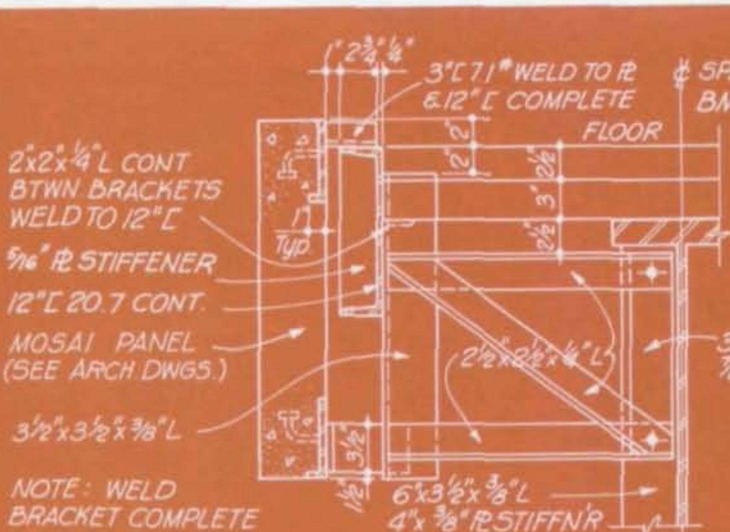
FLOOR PLAN—LOWER TOWER FLOOR
13,040 Sq. Ft. Useable Tenant Space

THE BUILDING IS DESIGNED ON A 4' 8" MODULE

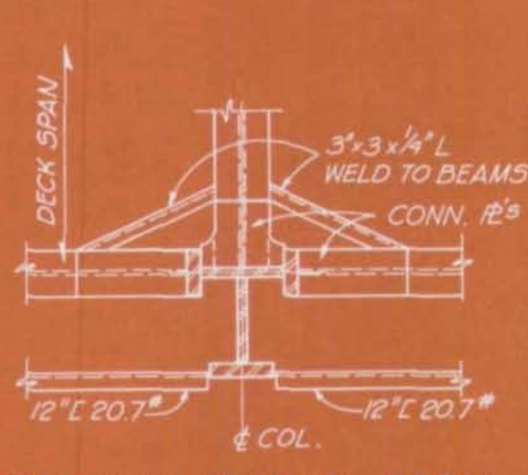
The entire second floor is devoted to the employees' lounge, cardroom and cafeteria, and to the officers' lounge and dining rooms. These rooms are handsomely finished to provide a setting for more of the owner's collection of fine art. Located on the 12th floor is a 100 seat auditorium complete with all types of audio-visual equipment. The auditorium opens onto a spacious lounge area, offering an excellent facility for sales meetings and gatherings.

The 30th floor is devoted entirely to restaurant, cocktails and banquet use. There are three cocktail lounges and a banquet suite, with movable walls, to accommodate groups of 35 to 350.

The exterior wall treatment seems a logical evolution of practical considerations which create an interesting pattern and texture. The columns and spandrels from the 3rd floor up are faced with precast panels, in a white and rose quartz aggregate, which establishes the major pattern. The overlay pattern is established by secondary precast mullions which locate the bronze tracks for the window washing carriage.



TYP. SPANDREL BRACKET



TYP. DECK BEARING DETAI

One level below the street, a sunken garden and sculptured fountain create a lovely setting for dining.

This pattern of hard materials limits the largest area of metal and glass (the materials most subject to movement with temperature changes) to approximately 140 sq ft, and virtually eliminates the problems of overall wall expansion and contraction. The enclosure from the 3rd floor down is granite, stainless steel and glass.

The building is self-lighted at night with fluorescent tubes recessed above all window areas, outside the fiber glass curtains which are the standard for the entire project.

Tenant space is completely column-free from exterior wall to core, and features acoustical ceilings with recessed light fixtures and soundproof movable partitions to provide quick and complete flexibility of office arrangement. Cellular floors permit immediate placement of telephone and electrical outlets at any desired location.

Structural Steel Features

Structural framing and steel cellular floors were chosen for the construction of Commerce Tower primarily for reasons of speed of erection and for the ultimate flexibility in mechanical and electrical services.

The advantage of the steel frame became very apparent before the building was completed. When a decision was made, after the steel frame was erected, to install restaurant facilities on the 30th floor, relatively minor additions and alterations to the framing made it feasible to design a handsome dome, rising up through the 31st and 32nd floors above a circular bar and cocktail lounge to create a spectacular all-glass "oriel", a dining area and cocktail gallery, on steel brackets projecting out 10 ft beyond the building wall on the north side.

Typical tenant floors are designed for 100 psf live loads, including the movable metal partitions. Wind load design is 35 psf up to 100 ft, and 40 psf above that level.

The 9,000 tons of structural steel framing are shop welded and field bolted.

Exterior columns are built-up of five A441 welded plates designed for bending capacity in two directions. Spandrel and wind girder connection plates were shop welded to columns and field connected with high strength bolts. Interior columns are A441 or A36 plates welded to an H-shape with a maximum flange thickness of 5 in.

Architect for the project was John T. Murphy, FAIA, Kansas City. Structural engineers were Alfred Masterson, and Pfuhl and Stevson, Kansas City. General contractor was Henry C. Beck Builders, Inc., Dallas, Texas. Steel fabricator was Kansas City Structural Steel Co.

CLEAR SPANS OF STEEL FOR AN AUDITORIUM

by Donald E. Stewart, AIA

As on nearly any addition, we were given several goals to reach simultaneously in designing the W. D. Carmichael, Jr. Auditorium addition to the University of North Carolina's Woollen Gymnasium in Chapel Hill, North Carolina.

The University wanted space for indoor athletics – with major emphasis on basketball – plus facilities for events such as commencement, student convocations, drama, and seating for most of the student body and faculty. Sight lines for the spectators had to be unobstructed.

Architecturally, the new addition could not be permitted to detract from the present structure, physically or aesthetically. And, of course, we were obliged to design the building with normal attention to economy.

Because of the rigid frame structural system, free of any supporting columns among the seats, anyone sitting in the auditorium has a clear view of the playing floor. Steel seemed the best mate-

(See page 8)

by Ezra Meir, P.E.

Certainly one of the outstanding features of the W. D. Carmichael, Jr. Auditorium addition is the unusually long span of the welded steel frames concurring at the center ring to support the roof load. Maximum span, center to center of the columns is 316 ft-6⅛ in.

Each frame is built up entirely of steel plates, welded in both shop and field. The frames were shop fabricated in four sections. The flange plates in each section were attached to the web plate with a continuous weld.

To erect the framework, a 68-ft-high steel falsework tower was provided, approximately 20 ft toward the existing gym from the center line of the structure. This tower supported the steel compression ring, weighing in at 52 tons. When the frames had been welded to the ring, the falsework was removed.

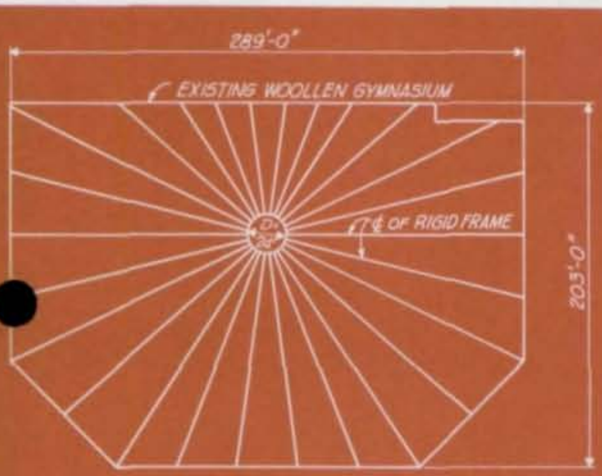
The rigid frames are tied at the base by two eye-bars welded to the rod with an upset screw thread end for a turnbuckle. These eye-bars are connected to

(See page 8)

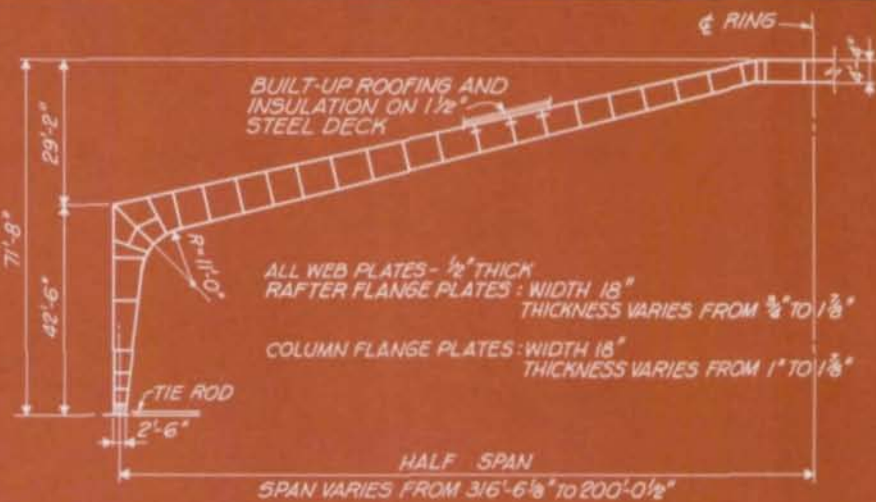
Mr. Stewart is a partner in the firm of City Planning and Architectural Associates, Chapel Hill, North Carolina.

Mr. Meir is the principal in Ezra Meir & Associates, Raleigh, North Carolina.

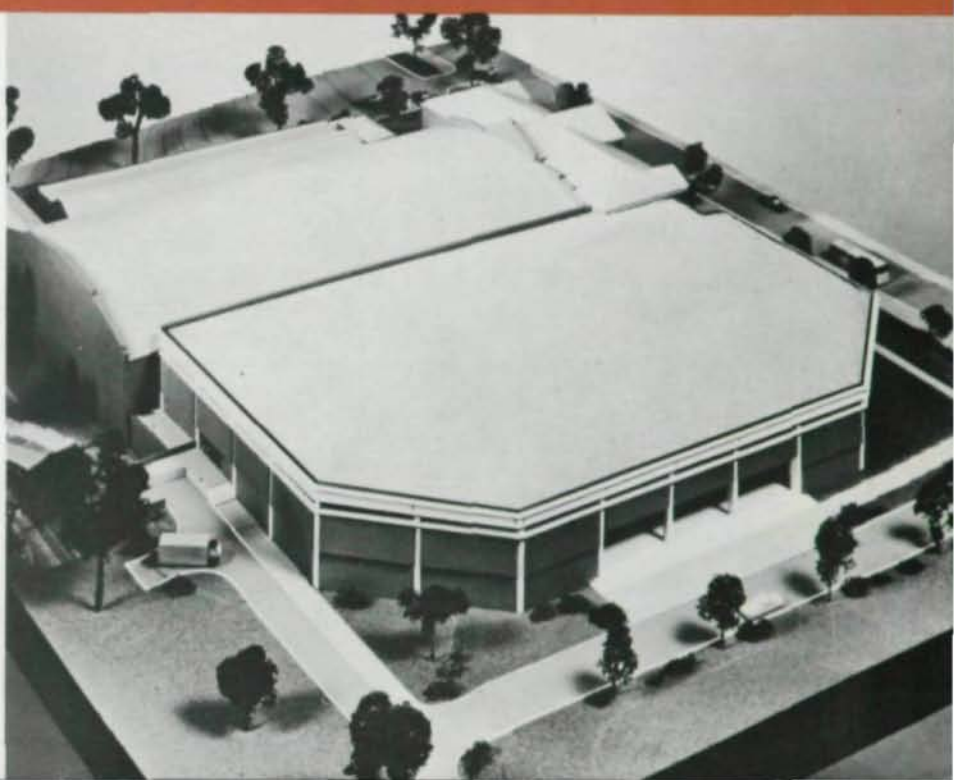
Long spans of steel, stretching as far as 320 ft with no supporting columns, provide an unobstructed view of basketball games and other events.



ROOF FRAMING PLAN
SHOWING RIGID FRAMES & CENTER RING ONLY



TYPICAL DETAIL OF RIGID FRAME



Architect: City Planning and Architectural Assoc., Chapel Hill, N. C.

Structural Engineer: Ezra Meir Associates, Raleigh, N. C.

General Contractor: H. L. Cobel Construction Co., Greensboro, N. C.

Steel Fabricator: Carolina Steel Corp., Greensboro, N. C.

DONALD E. STEWART

rial for the system, since it (1) proved to be the most economical solution, considering the spans required—the longest over 300 ft, (2) could be assembled and erected rapidly, and (3) allowed us to design for the minimum depth of structural members, thereby squeezing out maximum cubage within the auditorium.

The half-octagon shape eliminated unnecessary square footage at the corners, reduced the visual size of the new addition, to prevent it from overshadowing the older building, and has the advantage of giving the seating a natural direction for viewing the main court.

The rigid-frame system also solved the problem of maintaining a wall height approximately equal to the walls of the existing structure – again, so it wouldn't dominate the Woollen Gym. And our selection of brick facing for the new walls was prompted by the same goal.

When temporary seating is in place on the side of the auditorium adjacent to the older building, about 10,000 people can be seated. The floor space below the temporary seating is a stage. When the seats have been removed, the 24x40 ft stage is raised from floor level on four hydraulic jacks.

Locker and shower rooms, which originally protruded from the exterior wall line of Woollen Gym, are now incorporated into the design of the addition. They can be used from either building.

New administrative offices for the university's athletic department, rest rooms, storage areas and concession stands are located on the concourse level, at the periphery of the building, 11 ft above the lower floor. The main entrance, lobby, ticket booths and ramps to the seating areas are also on this level. Above the seats, on opposite sides of the auditorium, are, respectively, a press box and a platform for television cameras.

The roof is composed of cellular steel decking, supported by 14WF and 16WF purlins 6 ft-5 in. on center. The decking is topped with a 3-in. layer of insulation. Wooden strips, 4 ft on center, are anchored to the decking to provide a nailing surface for a mineral surface roll roofing. Main framing members below the roof are painted alternating shades of blue, blending attractively with the finish on interior walls and seating areas, which are trimmed in white and painted varying shades of blue.

The brick veneer walls are backed by concrete block, and are structurally independent of the frame. They are attached with expansion joints and a polysulfide weather seal. The new building is connected to the existing gymnasium with expansion joints.

Foundations consist of spread footings under columns, with a shallow, continuous footing under the walls. Floor is a reinforced concrete slab on grade.

The auditorium was completed near the end of 1965, at a cost of $1,700,000. The first basketball game was held in the new Carmichael Auditorium on December 4, 1965.

EZRA MEIR

the base plates with pins and are welded to the center steel plate, which in turn is anchored in its concrete foundation.

Bracing is provided at each knee to stabilize the haunch, which is 12 ft deep at the deepest section. Rafter bracing is built in with alternate purlins and column bracing in all spandrel beams.

In order to keep exposed rafters uniform and reduce the weight of the rigid frame, high-strength steel (50 ksi yield), was used for five of the longest rigid frames and for the center ring. All other frames are A36 steel.

The columns vary from a depth of 2 ft-6 in. at the bottom to 7 ft at the haunch. Rafter depth varies from 4 ft-4 in. at the center ring to 7 ft at the haunch. All flange plates are 18 in. wide. Radius of the haunch at the knee is 11 ft. The top of the center ring, the common part of the highest portion of all rigid frames, is 71 ft-8 in. above the top of the base plate.

The center ring, 24 ft in diameter and 4 ft-4 in. in depth, is composed of one rectangular hollow steel tube 2 ft x 4 ft-4 in., 1 in thick, which forms the outer circle, and a 1½-in. thick plate for the inner circle. Cover plates, ¾-in. thick, are on top and bottom, and ½-in. stiffener plates are located in the same direction as the webs of all rigid frames.

Basically, the theory of elasticity was followed in the design of the entire structure. "Castigliano's Theorem of Least Work" was used to analyze the redundant reaction components of each rigid frame, and to compute the vertical and horizontal deflections of these frames as affected by the roof covering loads. The assumption was made that both vertical and horizontal deflections at the center ring were the same for each frame. To achieve this assumption, the elastic loads were computed, and these loads were distributed to each frame by the function of their elastic property.

The combination of tension and compression ring was required to equalize the varying column loads caused by the offset-center design. After the center tower was removed, the geometry of the deformations horizontally and vertically checked very closely with the mathematics. I believe the use of high-strength steel in areas of greatest stress effectively combined economy and aesthetics in meeting the design requirements of column-free construction. A total of 1,100 tons of steel were used in the building.

NEW ANSWER TO AN OLD PROBLEM

THE DIFFICULT SITE

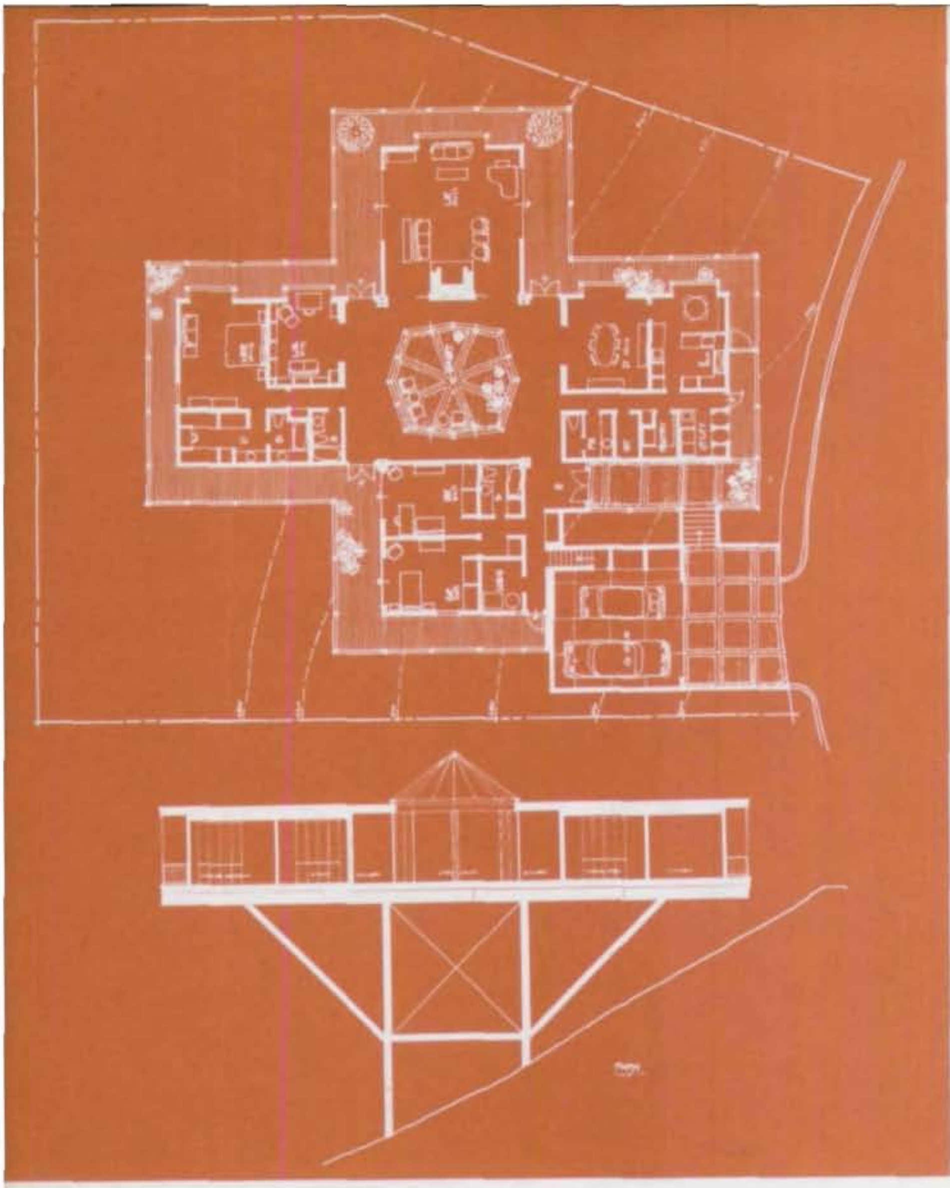
by **Harry W. Namitz, AIA**
Partner, Campbell & Wong & Associates
San Francisco, Calif.

Designing a residence for a steep lot is more of a challenge today in California than it was, say, 10 years ago. For one thing, it's no longer unusual. Almost any hillside street in a residential area is now lined with several – sometimes dozens – of homes soaring over drop-away lots, and supported by steel columns or pillars. For another thing, although much of this work is in bad taste, there are many undeniably beautiful solutions to the problem.

Therefore, when we begin work on a similar design, the challenge to improve on the past is very real and very strong.

While it would be incorrect to say the house you see here was our greatest single achievement, it is quite fair to state that it was a solution personally satisfying to both the client and the architect. And, in many ways, the inherent qualities of steel gave us the design flexibility necessary to do it.

For example, the strength-to-size ratio of steel made possible a structural "pedestal" for the house that is visually light, and which compliments the visual impact of the house. The underpinnings **look** strong to the untrained eye because the bracing is exposed and obviously steel. As a result, the house seems secure, comforting, permanent to the casual viewer. At the same time, living above the tree tops has its measure of excitement.



An octagonal atrium is the focal point of the living-dining area — provides "outdoor" feeling with complete privacy.

We began work with several general instructions from the owner. He wanted 5,600 sq ft of living space, and preferred to have it all on one level. The site he had purchased was unusually steep, dropping away from the street almost immediately at a 45-degree angle, and stopping along a creek bed 75 ft below the street level. Beyond the lower lot line, the hill continues to drop away to the city of Oakland, spread out in the valley. The owner wanted a house that would capture a commanding view of the city. We found that the best view was from a point about 60 ft away from the street.

Integrating the client's requirements, we evolved a house in the shape of a cross at a height and position best suited to the view. The octagonal-shaped atrium at the center of the cross serves several purposes. Above all, it acts as a focal point around which the dining and living rooms and the library participate by gaining additional light, and vistas. In addition, it gives the family a chance to enjoy "outdoor" living in a private setting. Incidentally, the rooms around the atrium may be closed off for privacy's sake. Each opening contains sliding louvered doors.

The entire house is held from 50 to 70 ft above grade on four steel column legs located at the four interior corners of the cross. The platform and skeleton of the house are steel-framed from foundation to roof, which eliminated the

Four steel columns hold house 50 to 70 ft above grade. Exposed bracing gives feeling of security to the viewer.

need for bracing the wood-framed walls. The steel columns rest on 48-in. diameter concrete piers extending to rock, tied together with grade beams, and secured to the site with rock bolts drilled and anchored 15 ft into the rock.

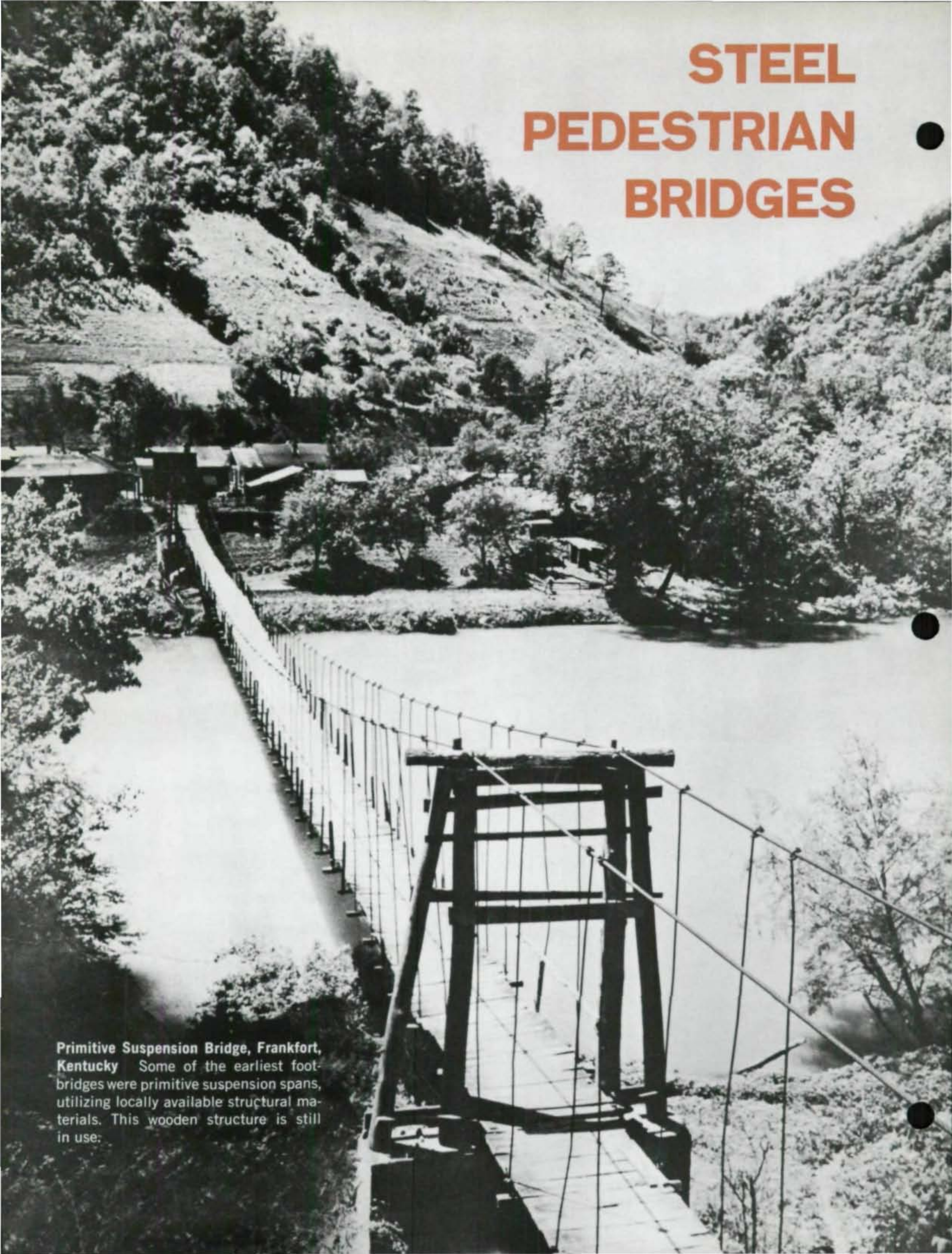
Over 70 tons of steel were used altogether. The steel crew erected the entire frame and platform in only four days. The main steel beams for the floor and roof are exposed both at exterior and interior walls, intended as a part of the total architectural expression.

Because there's a drop of 70 ft from the house, it was imperative that we include a 3 ft high sturdy, steel railing around the rim of the balcony portico. Psychologically, however, fear of the height is reduced by the sight of the full-leaved tree tops at about floor level. The garage also sits on four steel columns, but is isolated structurally from the house.

The exterior walls are of resawn redwood, while the interior walls are essentially sand-finished plaster and redwood. All ceilings in the house are made up of resawn, tongue-and-grooved hemlock. The floors are covered with teak parquet, mastic-applied to an elasticized, lightweight concrete slab, in which radiant copper heating pipe has been embedded.

Our firm, Campbell & Wong & Associates, San Francisco, was responsible for the architectural design. Eric Elesser & Associates were structural engineers. General contractor was Wally Burr of Berkeley. The owner is Mr. Kent Sawyer, Piedmont, California.

STEEL PEDESTRIAN BRIDGES



Primitive Suspension Bridge, Frankfort, Kentucky Some of the earliest footbridges were primitive suspension spans, utilizing locally available structural materials. This wooden structure is still in use.

Park Hill Pedestrian Overpass, Bismark, North Dakota. A high wire mesh fence was used instead of handrailing on this rigid frame footbridge.

By John G. Hotchkiss, Senior Regional Engineer, American Institute of Steel Construction, New York, N. Y.

Pedestrian bridges are as old as history. The art of bridge building began with simple timber or masonry footbridges, usually across small streams or rivers. The Algonquin Indians built primitive suspension bridges of vines. Caesar's legions marched across the Rhine on poontoon bridges, and every medieval castle had its moveable drawbridge over a moat. American infantry in World War II crossed rivers on Bailey bridges.

The pedestrian bridge of steel usually carries a different kind of army – an army of pedestrians seeking safe passage across a heavy stream of vehicular traffic. Officials responsible for traffic control and public safety are finding this modern version of the ancient footbridge to be an ideal solution to many traffic problems.

Pedestrian safety and traffic control have become serious problems in urban areas throughout the world. The rapid growth of population and the increasing number of vehicles in use have caused many control solutions to become inadequate. Traffic lights, median strips, "candy-stripes" on pavements indicating pedestrian zones – all provide some degree of safety to pedestrians, but do not alleviate the problem of interference with vehicular traffic. The continuous flow of **both** vehicular and pedestrian traffic, with maximum safety, can be achieved only by moving pedestrians over or under the vehicular traffic. Economically the choice is usually a pedestrian bridge over the roadway.

Modern steel footbridges are being built in increasing numbers across downtown urban streets, across parkways and superhighways, over railroad rights of way, between buildings high above street level, across waterways, and even across bridle paths.

Design Considerations

Most pedestrian bridges over roadways consist basically of a horizontal span and a means of approach at each end. When the approach is not level with the horizontal span, pedestrians must move upward and downward on stairs or ramps. In either case the means of access may be parallel to the span, at right angles, or horizontally curved in spiral or serpentine fashion. Where feasible, low gradient ramps are preferable to stairways, since elderly and blind pedestrians may be required to use the crossing. In certain situations, the use of an escalator may be desirable.

The pedestrian's vision from the bridge should be unhampered whenever possible. Open handrailing permits a continuous view on either side, and can be aesthetically pleasing when viewed from on or off the bridge. If a through-deck girder system is used, the top flange of the girders should be no higher than normal handrail height. Careful attention to the outward profile of the bridge and to handrail details can lead to a design that appears clean cut, light and attractive.

The choice of structural material is an important consideration, both aesthetically and economically. Structural steel offers the advantage of light appearance, light weight, quick erection (most pedestrian bridges can be erected during evening hours when traffic is light), and low cost. Tasteful and imaginative use of color can enhance the visual appeal of a steel bridge. For these reasons, most footbridges over railways, streets and throughways have been and are being built of steel, both in this country and abroad.

Bridge Over the Brenta River, Padua, Italy For spans greater than 1200 ft, the steel suspension bridge may provide an economical as well as aesthetic pedestrian crossing.

Bridge Over Route B1 in Essen-Frillendorf, Germany A wide hollow box girder supports the walkway. Serpentine access ramps provides a low gradient and are attractive features of the structure.

Burnham Park Pedestrian Bridge, Chicago, Illinois The span length of this graceful arch bridge is 115 ft. The deck follows the contour of the arch.

Bridge near Dortrecht, Holland This through-deck plate girder bridge spans the roadway without intermediate piers. Tops of girders are at normal handrail height to permit pedestrian visibility at the sides. Access ramps are at right angles to the main span.

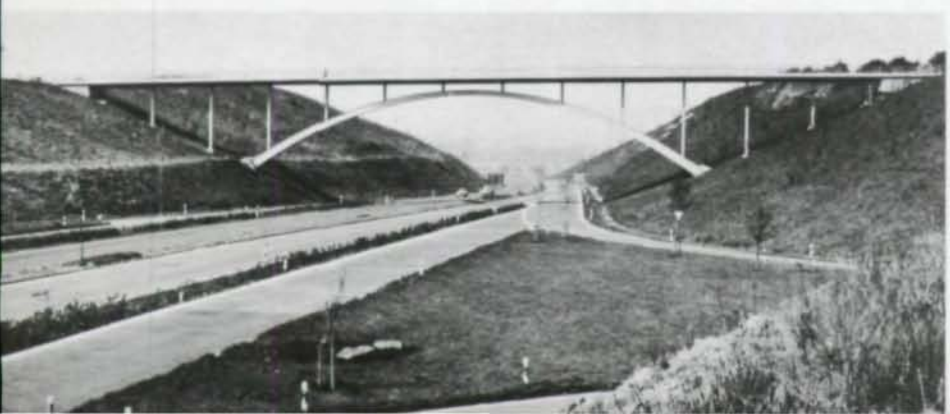
Bridge Over the East Memorial Shoreway, Cleveland, Ohio This suspended deck arch bridge spans 197 ft. The arch rib is a welded steel box girder. Round steel bar hangers support the deck and serve as handrail posts.

Bridge at Killesberg, Stuttgart, Germany Girders below the deck and simple, open railing permit unhampered view on either side.

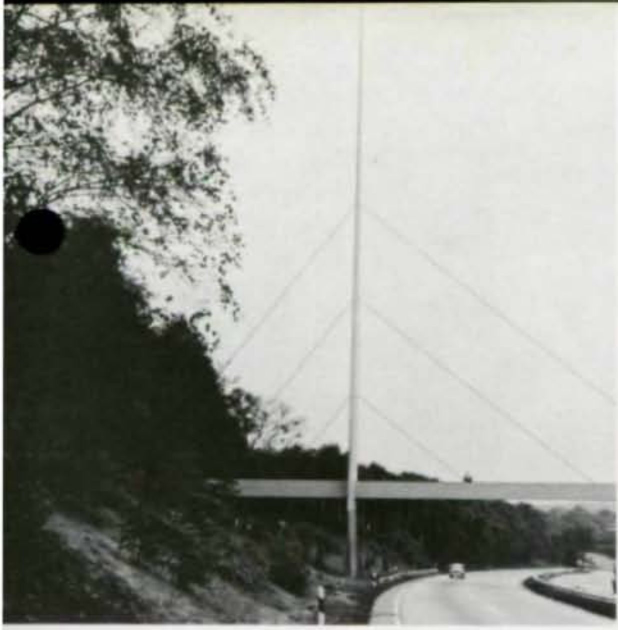
Garrison School Pedestrian Bridge, Kansas City, Missouri The sloping steel piers of this rigid frame structure provide a light, pleasing appearance from the roadway.

Footbridge in Westfalen Park, Dortmund, Germany This graceful span is designed as a rigid frame. The main girder and sloping piers are hollow box sections.

Bridge Over College Avenue, Long Beach, California Spiral access ramps achieve low gradients in a limited distance.

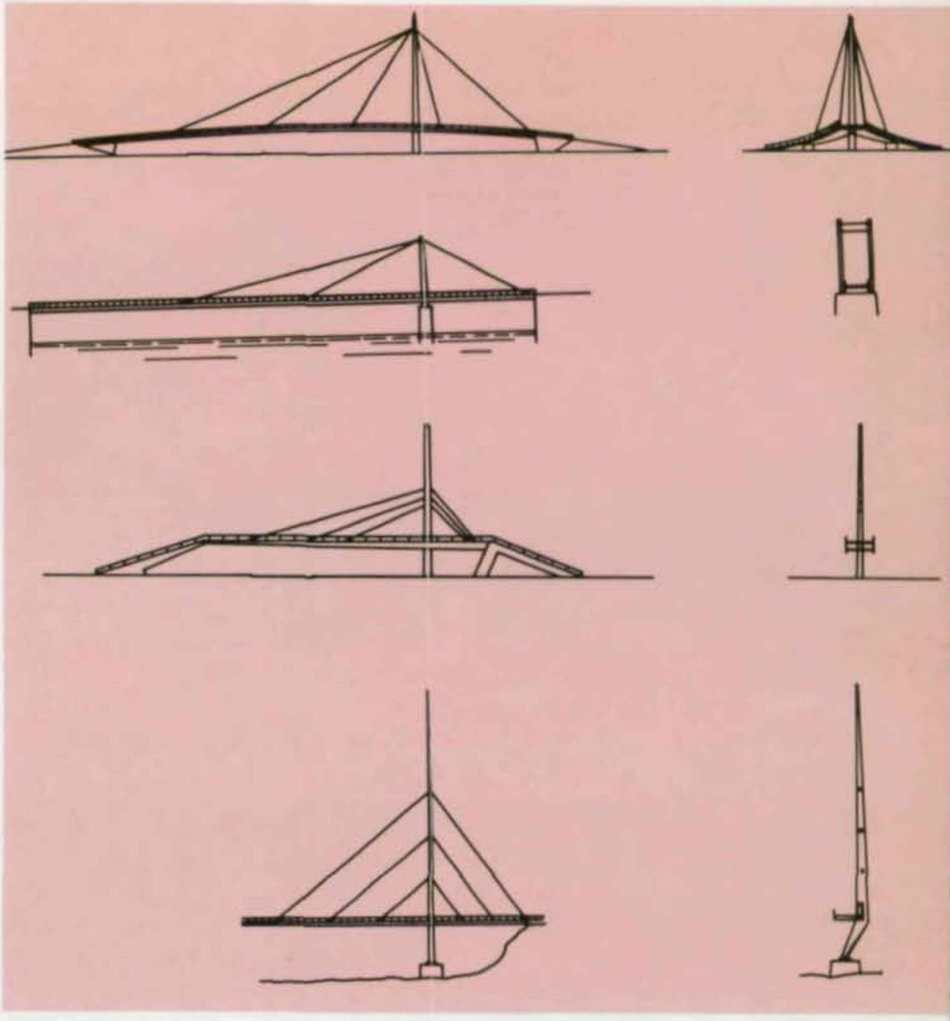


Bridge Over the Autobahn at Aachen, Germany The arch ribs are below the deck and anchored at both ends. Span is 197 ft.



Bridge Over the Autobahn at Duisberg, Germany This cable-braced footbridge is a lovely landmark in a rural setting.

Cable-Braced Bridges A new trend in European vehicular and pedestrian bridges features design in which the main longitudinal girders are stiffened by a system of cable braces tied back to one or two pylons.



Bridge Over the Glacis-Chausee, Hamburg, Germany This footbridge seems to "float" across the roadway. A light, graceful appearance is typical of this type of cable-braced bridge.

Bridge Over the Schillerstrasse, Stuttgart, Germany This pedestrian overpass is cable-braced to a single tapered pylon near one end. The total distance between abutments is approximately 285 ft, with the spacing between attachments approximately 59, 55, 55, 55, 59 ft. The walkway is 16.4 ft wide.

Bridge Over the Rheindamm near Lindemannstrasse, Dortmund, Germany
A hollow steel box girder is the main support for this pedestrian overpass. Tapered steel piers contribute to the graceful appearance of the structure. Overall length is 279 ft; total width is 11 ft-6 in.

Photo credit: many of the photographs in this article are presented through the courtesy of Acier-Stahl Steel magazine.

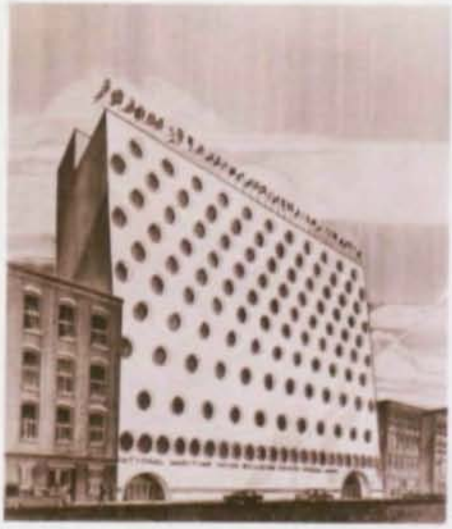
Robert Street Overpass, Fort Worth, Texas Topography permits elimination of ramps or stairways for access to the bridge.

Chaffee Avenue Pedestrian Bridge, Syracuse, N. Y. A welded through-deck plate girder structure. Span length is 123 ft. Access is at grade, eliminating the need for ramps.

Niles Street Pedestrian Overpass, Leominster, Massachusetts A clean, simple profile makes this plate girder bridge appear light and airy when viewed from the roadway.

Harlem River Pedestrian Bridge, New York, N. Y. Spanning a navigable waterway, a 312 ft vertical lift span permits the passage of large ships. The end spans are approximately 216 ft and 252 ft.

steelnotes



Sloped Front Avoids Setback

One of New York's most unusual buildings is the new $5,000,000 National Maritime Union's Help, Training and Recreation Center, nearing completion on Manhattan's West 17th Street. The 11-story steel-framed structure slopes inward 8½ degrees off the property line, to avoid a "setback" required by local zoning ordinances. New Orleans architect Albert C. Ledner created this sloped-front design to comply with the law and still provide a handsome structure that could house many activities in a rather limited space. Another unusual feature is the use of 6-ft diameter windows shaped like ship's portholes, with a center pivot so they can be cleaned easily from the inside. Furman and Furman, architects, and Hertzberg and Cantor, structural engineers, also participated in the project.

New Library by Mies van der Rohe

The new District Central Library in Washington, D.C., will be a 4-story, black-painted steel and bronze-gray glass structure that will hold 2,000,000 volumes. Designed by Ludwig Mies van der Rohe, the building is scheduled for completion in January, 1970.

Park-Like Setting

Each office on the first floor of this steel framed two-story office building will open to its own garden area. The 11,800 sq ft structure is the final phase of a 2 million dollar industrial complex in Seattle, Washington. According to architect Richard Dorman, "The primary concept was to create a park-like feeling in an industrial area." Structural steel framing and normal stud and plaster construction were used for the sculptured facade. Structural engineer was Frank L. Burke, and general contractor was Donald F. Buhler.

New Railroad Depot in Milwaukee

This three-story railroad depot was recently completed in downtown Milwaukee. More than 6000 sq ft of useable space is provided. Structural steel was selected for the building's framework because of its inherent advantages for winter construction.

The framing utilized a simple beam design for the dead load, but by field welding connections after the slab had been erected, continuity was incorporated in the design. This was not only economical but controlled the live load deflection.

One of the features of the building is a 96-ft-high bell tower which forms part of the front facade of the building. The unique tower is constructed of special low alloy steel. It is supported on four tubular legs, 36 in. x 31 in. in cross section.

Howard-Needles, Tammen and Bergendoff, Consulting Engineers, designed the building. Donald L. Grieb & Associates served as Architects on the exterior and the first floor interior. Steel fabricator was Worden-Allen Company.