NEWS FROM

American Institute of Steel Construction

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ALASKA ON THE WAY BACK

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A copy of Modern Steel Construction is available without charge to professional architects and engineers on request under their letterhead to American Institute of Steel Construction, Inc., 101 Park Avenue, New York, N. Y. 10017, Room 1501.

AMERICAN INSTITUTE OF STEEL CONSTRUCTION, INC.
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September 11, 1964

IN THIS ISSUE ---

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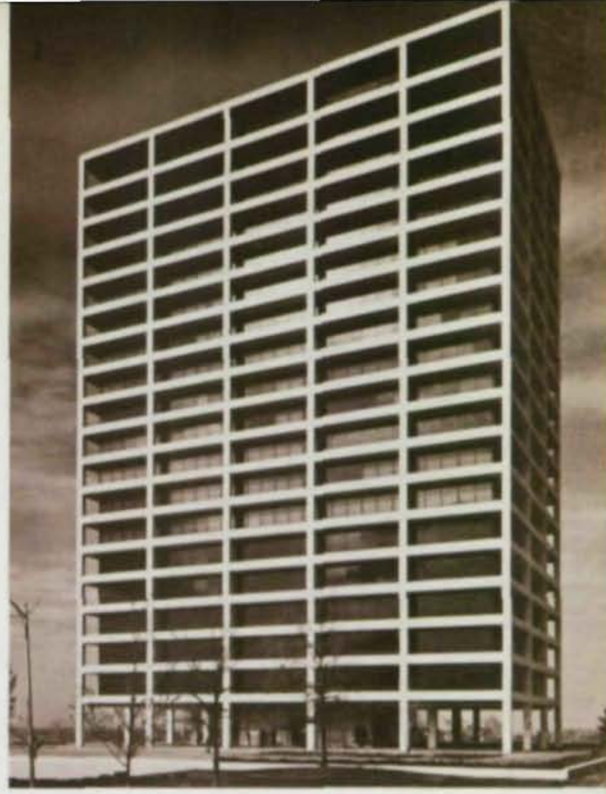
MODERN STEEL CONSTRUCTION



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AAE Competition Demonstrates Architects' Ingenuity

"Architects are more imaginative in the use of steel than those of a decade or two ago." So said the jurors of this year's Architectural Awards of Excellence (see page 3), sponsored by the AISC.

The twelve winners were selected from among 140 entries — more than ever before in the five-year-old competition. In appraising them, the jurors agreed that "the increasing facility of both architects and engineers is evidenced by the superb craftsmanship of these buildings."

Inscribed plaques will be presented to the winning architects at appropriate ceremonies attended by their colleagues. Certificates will go to the winner, contractor, structural engineer, and steel fabricator in each case.

1963-64 Prize Bridge Competition

Entries are invited for the AISC's 36th annual Prize Bridge Competition. Steel bridges of all kinds are eligible, provided they are in the U. S. and were opened to traffic since January 1, 1963. The contest, which closes October 10, 1964, is designed to encourage the uses of structural steel in bridge construction by recognizing the professionals who design the nation's bridges using structural steel in imaginative and aesthetic ways.

1964 ARCHITECTURAL AWARDS OF EXCELLENCE

A Residence for Mr. & Mrs. John F. Maher
Houston, Texas
Architect: Howard Barnstone & Partners

California Credit Union League
Headquarters Building
Pomona, Calif.
Architect: Balch-Hutchason-Perkins

By Henry L. Wright, FAIA

The Industrial Revolution which began during the latter half of the nineteenth century provided opportunities for invention the like of which the world had never seen before. Because of this industrialization the improvements that have occurred and which continue to occur in man's physical environment seem almost unlimited.

Iron and steel were known to man for centuries but never before developed to a degree of usefulness as structural elements until the advent of this machine age. The Crystal Palace in London, a fine combination of steel and glass, and the Eiffel Tower in Paris, an assembly of "strap" iron and steel, are examples of man's ingenuity and creative use of these newly developed materials in buildings. The extremely rapid advance of technology in this century is producing a pallet of building materials which allow architects unlimited opportunities to express their imagination and creative talents never possible fifty years ago.

To encourage the use of steel in buildings and to give recognition to fine examples of architecture in which steel is the major structural element, the American Institute of Steel Construction, five years ago, launched an annual program of architectural awards for excellence. This awards program affords the architect the opportunity to present his completed buildings for this recognition as a means of acquainting the public and his colleagues with various design solutions in which steel is used as the basic structural element.

This year, a jury of four architects and an engineer was selected by AISC to judge all entries. The rules of judging were left to the jury, which adopted the usual criteria prescribed by The American Institute of Architects. Basically, the building had to be successful as to function, be a good architectural design concept and contribute aesthetically to the surrounding environment. A total of 140 entries were judged, and the jury named twelve buildings of all types as worthy of recognition as examples of architectural excellence.

The Bethany Fire Station, designed by the architectural firm of Locke, Miner & Smith, Inc. of Oklahoma City, is an illustration of a straightforward, simple solution, inexpensive and appropriate in scale and size to its use in a small community, which displays the fire equipment as a part of the total design. The detailing and color schemes are honest, unpretentious, and dignified.

Another simple and straightforward solution to an unusual structure was the cattle judging ring at Los Banos, for the Merced, Calif., County Fair Grounds. This building expresses its function beautifully in its form and proportions. The sophisticated crudeness of its structural connections illustrates the simplest way to put steel together and at

Henry L. Wright, FAIA, a past president of the American Institute of Architecture, was a member of the 1964 AAE Jury of Awards.

Judging Ring
Los Banos, Calif.
Architect: Raymond R. Franceschi

United States Gypsum Co. Building
Chicago, Ill.
Architect: Perkins & Will Partnership

Westinghouse Molecular
Electronic Laboratory
Elkridge, Md.
Architect: Vincent G. Kling

A Residential Bath Tower
Stony Point, N.Y.
Architect: M. Medcalfe

the same time achieves a pleasing aesthetic quality.

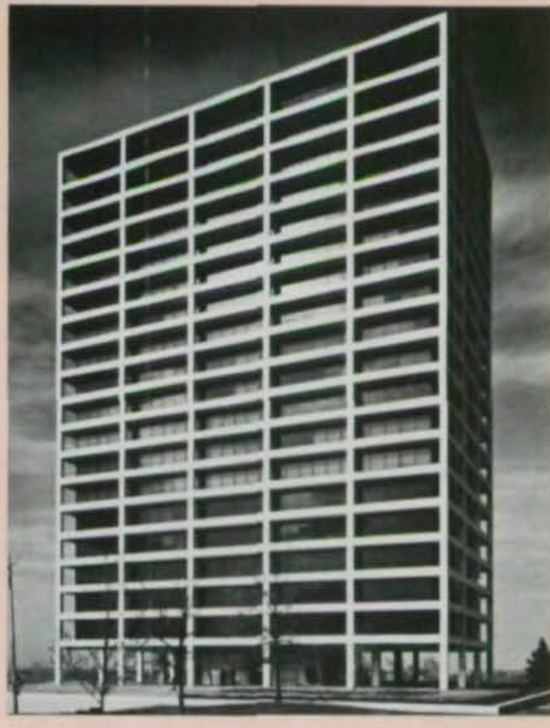
The *Daily Journal* Building owned by Home News Enterprises in Franklin, Ind., illustrates the simplicity with which steel can be used with wide spans so ably adapted to its function as a showcase for large newspaper printing presses and other machinery.

The architects, Skidmore, Owings & Merrill, have achieved a beautifully proportioned building with a structural system which is reduced to its very simplest elements expressed on the exterior by roof and columns.

The other building by Skidmore, Owings & Merrill which received an award is the BMA Tower in Kansas City, Mo., for the Business Men's Assurance Company of America. This building is another example of that firm's skill in combining steel and marble to create a building which expresses its structure honestly and simply. The exterior expresses a combination of structure and glass recessed for sun control, forming a gallery on all four elevations. The siting of the building with ample space on all four sides adds to its importance as a significant asset to the community.

The United States Gypsum Building in Chicago, designed by architects Perkins and Will, is another example of excellent siting. This building is located on a corner lot in a high density area of downtown Chicago. Its diagonal position on the lot provides larger open spaces on all sides than would have been possible if the building were placed parallel with the property lines. The building expresses an originality of design and fine use of materials using slate and gray

Bethany Fire Station
Bethany, Okla.
Architect: Locke, Miner & Smith, Inc.



BMA Tower
Kansas City, Mo.
Architect: Skidmore, Owings & Merrill

United States Pavilion
World's Fair, N.Y.
Architect: Charles Luckman Associates

glass as curtain walls. All interior columns are eliminated to provide maximum flexibility, an excellent solution for its function as an office building.

The firms of Minoru Yamasaki–Smith, Hinchman & Grylls combined their talents as associates to create the Michigan Consolidated Gas Co. building in Detroit. This building rises 38 stories on the waterfront of Detroit adjacent to the Convention Center. It serves as a handsome sign post for downtown Detroit. The proportions are beautiful, of simple design carefully detailed, expressing its structure on the exterior.

The New York World's Fair has been a disappointment to both art and architectural critics whose opinions are generally shared by many, both in and outside the profession. The major criticism is that the whole complex is a heterogeneous mixture of individually designed structures that do not relate to each other or a general plan as a whole. There are one or two structures that do merit recognition as individual buildings. Among the World's Fair buildings submitted there was one building that, in the opinion of the jury, was worthy of an award. The United States Pavilion by Charles Luckman Associates presents a dramatic engineering approach in the use of steel. The tremendous spans supported upon four piers which elevate the entire structure one story above the ground are in themselves a major engineering achievement. The building is simple and bold and presents a relatively old material, plastic, to a new use.

The California Credit Union League Headquarters Building in Pomona, Calif., designed by the Balch-Hutchason-

The Daily Journal
Franklin, Ind.
Architect: Skidmore, Owings & Merrill

Academic Center
Gwynedd, Pa.
Architect: Nolen, Swinburne and Assoc.

Michigan Consolidated Gas Co.,
Office Building
Detroit, Mich.
Architect: Minoru Yamasaki—
Smith, Hinchman & Grylls

Perkins firm of Los Angeles, is a straightforward solution to the problem of a small office structure facing a street with heavy traffic of cars and buses. The offices are grouped around an inner court with only small openings on the street side. The combination of small windows and large, flat, textured panels presents a pleasing design which achieves the objective of reducing street noises to a minimum.

A most unusual solution to the problem of providing expansibility to an industrial plant is a design by architect Vincent G. Kling, FAIA, of Philadelphia. The building complex houses the Westinghouse Molecular Electronic Laboratory at Elkridge, Md. The first increment is so planned that each addition will follow an orderly pattern repeating the basic elements. At every step of expansion, the total complex will remain a distinguished work of architecture. This group of buildings is truly a clean, sharp, and straightforward solution to expansibility.

A good, workable school plan is the Academic Center for the Sisters of Mercy in Gwynedd, Penna., designed by Nolen, Swinburne and Associates of Philadelphia. The plan is well organized, with clean detailing throughout. Steel is exposed on the exterior in its structural form and backed up with non-structural walls of a warm brick which provides a harmonious expression of both structure and materials. The building is also well sited, which contributes much to the whole plan.

It is not generally easy to use exposed steel in residence design. An outstanding exception to such a use is the residence for Mr. and Mrs. John F. Maher of Houston, Tex. The architects, Howard Barnstone and Partners of that city, have achieved an unusual and beautifully executed structure which encloses the living room-dining room portion of the house. This space is elevated on four masonry posts one story above the grade and is approached by a glassed-in bridge from the main house. The room is completely surrounded by glass from floor to ceiling, which looks out away from the street upon a densely wooded area in the heart of the city and yet provides absolute privacy. The exposed steel structure is dramatically expressed and carefully detailed, which illustrates the architect's keen appreciation of the nature of steel and its possibilities.

The most unique building submitted for an award, and one which fascinated the jury most, is the residential bath tower at Stony Point, N. Y., designed by M. Medcalfe, architect and owner. This is a structure completely detached from the house in a wooded setting. It contains two bath tubs – a Japanese bath and a Finnish Sauna – two stories in height. The structure is of welded steel completely enclosed on the exterior with wood strips placed vertically. The total concept is playful, showing creative imagination in its form and use of materials.

The jury was impressed by the wide variety of design solutions as illustrated in all the buildings submitted. The general quality level of the buildings was high, which indicates that architects and engineers are acquiring a better understanding of the design potentials of steel, both in structure and architectural expression.

STEEL PUTS WINNIPEG ON THE AIR MAP

The new $10 million Air Terminal Building at International Airport, Winnipeg, Canada, is of special interest because of the massive steel truss system and its fireproofing.

The building involves 3400 tons of structural steel, has a flat roof deck, and is 106 ft. wide and 481 ft. long. Spanning the width, 24 ft. on center and 46 ft. above the floor, are 20 giant trusses which measure almost 9 ft. from the top to the bottom chord.

The trusses are braced by several rows of bridging. Two rows, full-truss type, run the length of the building at mid-span. Two rows, about 15 ft. in from each side-wall, are lower chord bracing only. The bridging is stiffened by additional cross members midway between each main truss. There is also perimeter bracing. The truss system is fireproofed with vermiculite plaster on metal lath.

Seven carloads of lath, channels, and accessories; 5,000 bags of gypsum plaster, and 3,000 bags of vermiculite plaster aggregate were used for the trusses and their bridging. The lathing and plastering contractor was Halldor Sigurdson & Son, Ltd., of Winnipeg.

The steel members of the bridging system were individually wrapped, as were the trusses in the area between the two center rows of bridging. This section is 46 ft. wide and accommodates mechanical equipment and a catwalk that runs the full length of the building. On each side of the center section the trusses are exposed for 30 ft. in from the sidewalls.

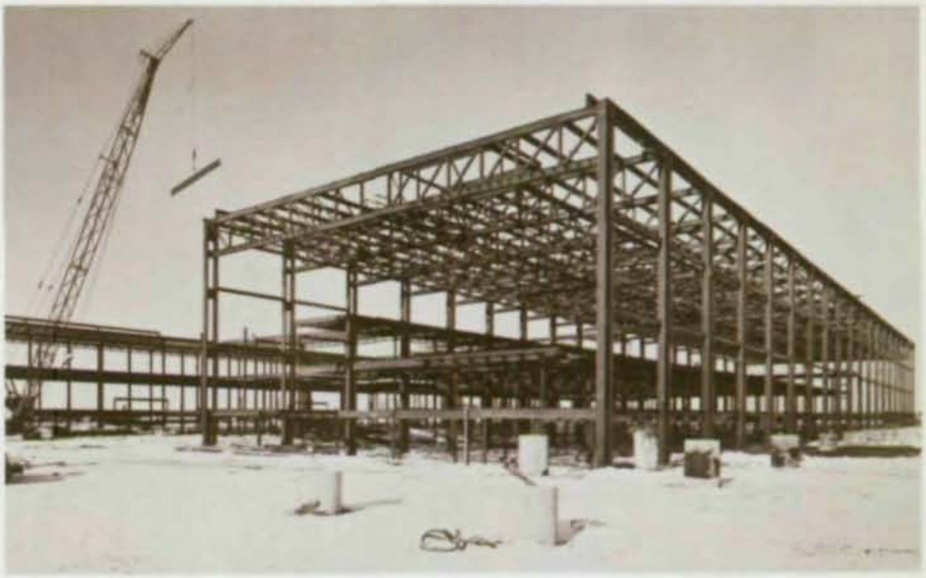
Altogether, 152 panels, 15 ft. wide and 8 ft. 9 in. high, were made for the truss enclosures. They consist of ¾" channels running vertically and spaced 12" apart; three 1½" channels about 34" apart, horizontally; and 3.4 diamond mesh metal lath tied to the ¾" channels with No. 16 wire. The vertical channels project about 15" beyond the horizontal channels.

The panels ride on the upper and lower flanges of the truss I-beam chords, and were tied together from each side of the truss on the ¾" channels with No. 8 wire. Eight panels were used per truss. The bottom soffits of the trusses were wrapped with metal lath and plastered. The vermiculite plaster was applied by machine in two coats to a thickness of ⅝" on the sides of the truss, and 1½" on the bottom soffit. On cross-bridging members, the fire-proofing was applied manually 1½" thick.

A luminous ceiling is suspended over the center section. Where they are exposed on each side, the trusses are clad with baked enamel steel paneling. A suspended ceiling of vermiculite acoustical plastic, six feet higher than the luminous ceiling, is applied on the 30-foot-wide lateral strips where the truss shapes are visible. The over-all effect provides an interesting, attractive contrast of materials and textures. "Diamond dust" is used over the surface of the acoustic for additional glamor.

Architects for the project are Green-Blankstein-Russell Associates. The general contractor is Commonwealth Construction Co. Both are Winnipeg firms.

Designed to accommodate the largest jets flying now, as well as the titans of the future, the new Terminal Building and its new auxiliary service facilities make Winnipeg a major link in the chain of modern air terminals being built across Canada by the Department of Transport. Winnipeg is also the main base for re-supply operations of the Distant Early Warning Line.



A progress report on the rehabilitation of Alaska's earthquake area

ANCHORAGE—60 DAYS AFTER

by Harold C. Smith

Of primary concern in the design of structures to resist earthquake forces is the protection of human life. Quite naturally, in the wake of severe seismic action, the first question that comes to our minds regards the death toll. Only after that does one think of property damage and loss.

Deaths in Anchorage directly attributable to the earthquake were less than ten. Total fatalities that could be charged to this disaster in all its forms including tidal waves were slightly over 100.

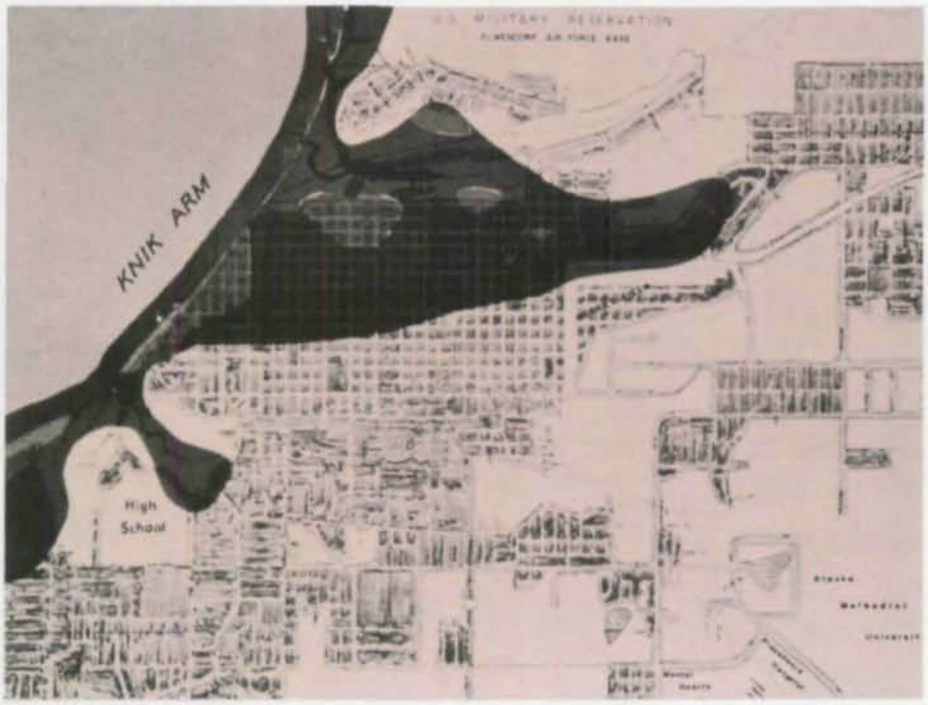
Closely related to damage, but not always immediately apparent, are the ease and speed with which damage to a particular structure can be repaired and the building put back in service.

Immediately following the Alaska earthquake of March 27, 1964, a team of representatives of the steel industry was dispatched by the American Iron & Steel Institute to study the effects of this disaster. Sixty days later the American Institute of Steel Construction sent another team of engineers to the Anchorage area. These men had two objectives: a search for additional information on the behavior of structures and an investigation of the progress and extent of repair and rehabilitation.

The map, below, of the Anchorage area delineates areas of major damage. The darker shaded portions indicate landslides and massive land movements which produced large land drops or graben. The Turnagain-by-the-Sea area, formerly the finest residential suburb of Anchorage, was the scene of one of the most spectacular landslides and, shortly after the quake, much of it was reduced to a jumbled mass of sand, gravel, huge chunks of soft clay such as underlies the entire area, and shattered beams.

The most publicized land drop occurred just north of Fourth Avenue. There was no hope for repair of structures in this area and by the time of the second visit all buildings had been razed and the land graded off, as seen in the photograph of Fourth Avenue taken from the top of the Anchorage Westward Hotel (opposite page).

Of more structural significance are those engineered structures which were not in areas of land movements. One such was the Cordova Building, a six-story, steel-framed office building. Reported by some sources as needing major repair and possibly being a total loss, this structure was actually the first damaged multi-story building in Anchorage to be restored to complete occupancy. Significant structural damage to this building was confined to the concrete elevator shaft and one buckled column which unfortunately was braced at mid-height by stair framing. Since



Harold C. Smith is the assistant chief engineer of the American Institute of Steel Construction.

Fourth Avenue from top of Westward Hotel

the shear stiffness of a column is inversely proportional to the cube of its unbraced length, this column attracted a far greater portion of the lateral shear than it was designed to take. A portion of the building's exterior was of poured concrete four inches thick and designed to serve only as a curtain wall. Being very much stiffer than the steel frame, these walls suffered considerable damage in places but were easily repaired and had no effect upon the structural integrity of the building.

Structural damage in the Hill Building, an eight-story office building, was essentially limited to the two concrete elevator and stair towers which were depended upon to resist the lateral forces. Both of these elements suffered heavy damage at their bases where several inches of concrete was literally ground away as they slid back and forth in their footings. These cores were jacked back to the proper elevation and temporary elements were poured at intervals around their peripheries while permanent structural repairs proceeded. The steel frame itself was virtually undamaged although ends of some beams dropped as much as six inches with respect to the other end. This building was scheduled to be back in service by July 1.

Development of the fourteen-story Anchorage Westward Hotel tower, seen in the accompanying photograph on the next page, was in two stages, with the six-story addition in the final stages of completion at the time of the earthquake. The structure was basically a steel frame designed to resist vertical loads only. Where exterior shear walls occurred, they were load bearing; to expedite erection of the frame, small wide-flange erection columns were used and left in the shear walls. Some of the most severe damage to the shear walls took place at locations of the columns where, owing to a discontinuity of concrete, a plane of weakness was created. A transverse shear wall set back one bay from the front of the building was also considerably damaged. This wall contained three openings at each level and the spandrels over these openings were simply not strong enough to transfer the vertical shear. Some distress was also seen at the horizontal plane which had been the top of the parapet wall for the original eight stories. Unfortunately,

Hill Building

Anchorage Westward Hotel

Friendly Ford Agency

the double curtain of reinforcing steel had not been carried through this plane. Following the earthquake several steel connections were laid bare to check the damage, but none was detected. Sixty days after the earthquake, the first seven stories of the tower were reoccupied. At this writing, the hotel is completely occupied.

As a class, one-story, steel, rigid frame structures performed very well, probably better than any other group. Notable among these were the transit shed on the Port of Anchorage Pier, a gymnasium at Elmendorf Air Base and the Friendly Ford Agency, a pre-engineered, prefabricated building on Fifth Avenue. To the best of the writer's knowledge, no one-story, steel, rigid-frame structures suffered any but superficial damage and most came through completely unscathed. It is believed that none were required to be evacuated.

Why did these structures perform so well?

The author believes six factors contributed to their excellent behavior:

1. They tended to be regular in plan – all important in earthquake resistant design.
2. They were lightweight, both in roofs and sidewalls – there was little mass to respond to the earthquake.
3. The only lateral force-resisting elements were the frames themselves – no dependence was placed on more rigid elements.
4. Inherent in steel, rigid-frame connections is a quality of workmanship and structural coherence that is frequently missing in similar structures dependent upon other materials for their lateral stability. The lateral force resisting elements of these structures are of a material whose strength and ductility are well-known and fully predictable.
5. The positive nature of connections in a steel, rigid-frame are an important factor in its ability to withstand seismic shocks.
6. Certainly not least among these reasons were the designs themselves. Whether custom designed or of a pre-engineered variety, they were well thought out, and adequate attention was paid to details.

In somewhat sharp contrast to the behavior of the aforementioned class of structures was the performance of one-story buildings utilizing precast, prestressed concrete elements for their roofs and other structural elements. According to the most optimistic accounting, five such structures out of 26 in the Anchorage area collapsed. Another admitted to seven failures. The exact number is not so important as the reasons for their poor performance.

Two 14-story buildings, nearly identical twins, were the concrete framed Mt. McKinley Apartments and the 1200 L Street Apartments. A recent article in a leading professional society magazine stated that close inspection of these structures "reveals little damage that cannot be readily repaired." This writer must take strong issue with that statement, feeling that they very likely are not repairable at any reasonable cost. Sixty days after the quake no repair work had been started on either structure, nor had any decision been made as to whether repair would be attempted. A figure of approximately one million dollars was heard as the estimated cost to restore the Mt. McKinley Building to a serviceable condition.

Worthy of only brief mention are the Four Seasons Apartment and the J. C. Penney store. The former, a six-story lift slab structure, was, of course, a total loss. The latter, a five-story, reinforced concrete building with precast concrete exterior panels was in the final stages of demolition 60 days after the disaster.

The three-story, steel framed First Federal Savings Building shown here immediately after the earthquake survived the earthquake in generally good shape with the exception of damage to its masonry shear walls, which apparently were heavily fenestrated and improperly anchored to the steel frames. It could easily have been restored to service in a short time, but its owners, faced with some repair work, decided on some remodeling at the same time. The steel frame, floors, and interior partitions stand intact awaiting completion of remodeling plans. The large glass panels which survived with no damage were removed for storage and will be reused.

No report of the Alaska earthquake would be complete without mention of the many engineered structures which came through with little or no damage. Among these were the five-story, steel framed Providence Hospital, the three-story, steel framed Alaska Psychiatric Institute, the six-story, concrete Knik Arms Apartment, the recently completed Medical Center, a four-story, concrete structure and the steel frame powerhouse owned by the Chugoch Electrical Association.

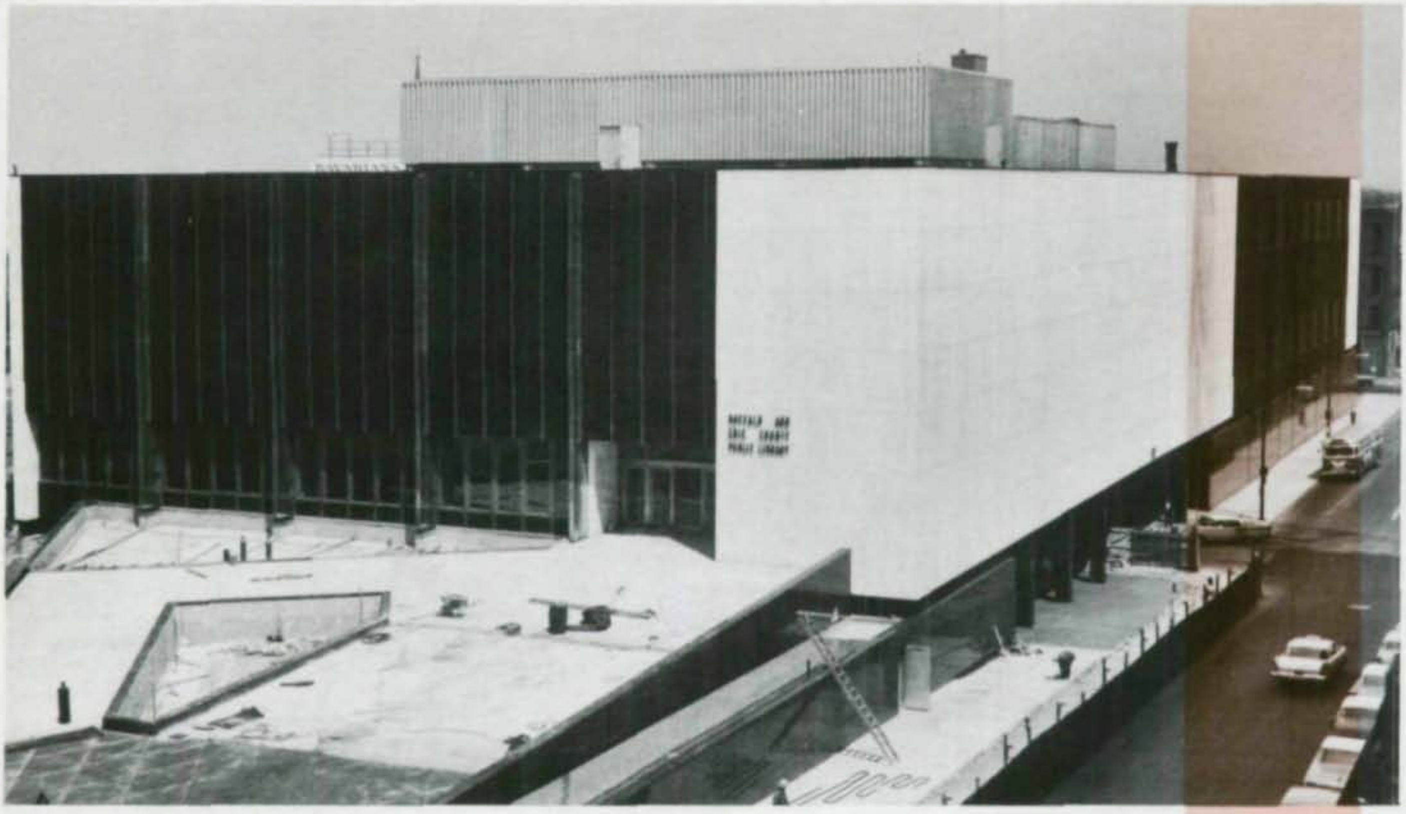
Anchorage provides us with many engineering lessons, and perhaps one of the most important is the relative ease and speed with which various structures were repaired. We believe most observers agree that steel framed buildings, in general, behaved better than other types of engineered structures, though admittedly not all came through "without a scratch." Such damage as did occur could almost invariably be traced to inadequate connections. As one person put it, "the trouble in Anchorage was lack of anchorage."

While ease of repair is no substitute for adequate connection strength, its importance in the wake of a disaster such as this can hardly be overemphasized. Given a torch and a welding electrode, a small amount of miscellaneous plain material and a fair amount of "know-how," it is surprising what repairs can be (and in this case were) made to a steel structure in a week's time.

Mt. McKinley Building

First Federal Savings Building

Providence Hospital



THE LIBRARY THAT CROSSED

Original section, above, is shown in color panel in illustration at top of page, which shows almost completed library.

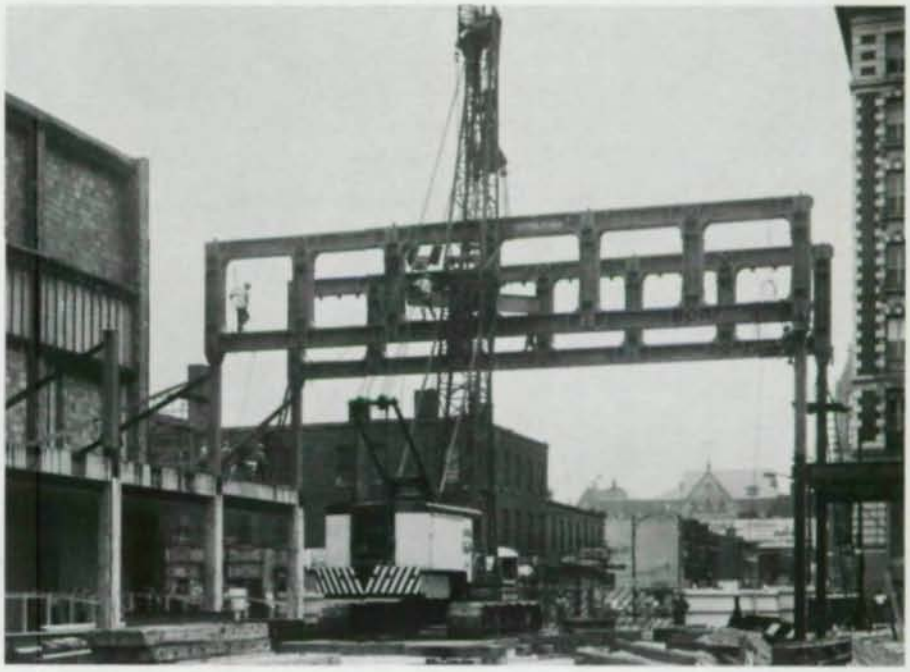
Seven Vierendeel trusses have given a lift to Buffalo book lovers. They are part of the steel framework of the new Buffalo and Erie County Library Building recently constructed over a street in the heart of the city's downtown area.

The 70-ton trusses support a four-story section of the library spanning Ellicott Street. This four-story "bridge" connects the west portion of the building, fronting on Lafayette Square, with the east portion.

The all-welded, stress-relieved trusses are 70 feet long and 13 feet deep and are supported by parallel rows of welded, box-shaped columns produced by Bethlehem Steel's Fabricating Works at Bell and Abby Streets. An 80-ton crawler crane hoisted each truss to its final place in the framework 35 feet above the street.

First floor of the "bridge" is suspended from the trusses, permitting a 15-foot-plus clearance above the street. A stack floor ties in with the bottom chords of the trusses, and top chords form part of the second-floor framing.

THE STREET



Architects James Wm. Kideney and Assocs., Paul Hyde Harbach and Elon B. Clark, Jr., and Consulting Engineer Thomas H. McKaig introduced the Vierendeels in the design because their open webs permit maximum access to library stacks.

"A much-needed landscaped area is created at the front entrance, providing a relaxing space in the heart of busy downtown Buffalo," says architect George Dick Smith, Jr.

"The site is sloping and crosses Ellicott Street. This fortunate site condition allowed the principal floor to run through the entire site, providing enough space for most public reading rooms."

The John W. Cowper Co., general contractor for the $9.5-million job, had spent several weeks preparing for the erection of the trusses by driving H-piling and pouring concrete footings for the west portion of the library. Bethlehem fabricated and erected the structural framework, which accounts for most of the 5,600 tons of steel it supplied for the job.

THE ART OF ENGINEERING

Structural steel played a feature role in an exhibition of "20th Century Engineering" at the Museum of Modern Art, New York. *Consisting of enlarged* photographs and plans of 193 projects from 28 countries, the exhibition was selected and installed by Arthur Drexler, director of the museum's Department of Architecture and Design.

Besides bridges, dams, stadia, and enclosures for storage, work, and public assembly, engineering at architectural scale shown in the exhibition also includes radar and telescope installations, highways, earth terracing, and artificial islands.

"The problems engineers solve cut across economics, politics, art, and science, affecting the lives of all men—on this planet now and eventually somewhere else as well," Drexler says.

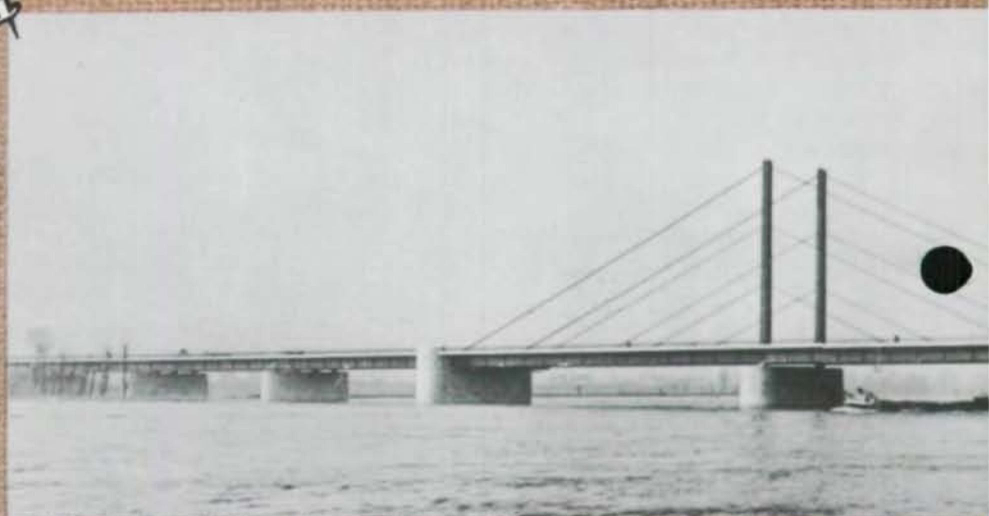
"Engineering is among the most rewarding of the arts, not only because it produces individual masterpieces as beautiful as the Santa Luzia Dam in Portugal of the Theodor Heuss Bridge in Dusseldorf but also because it is an art grounded in social responsibility."

Almost one quarter of the exhibition is devoted to soaring vaults and domes of various materials. Steel is used for a geodesic dome by Buckminster Fuller, the 630-foot-high Jefferson National Expansion Memorial by Eero Saarinen and Assocs. now under construction, and the largest steel dome to date, a stadium in Houston with a 642-foot span.

"Engineering as an art, "says Drexler," affords us such individual characteristics as the aristocratic elegance and restraint of Robert Maillart; the extravagant playfulness of Felix Candela; the expressive rhetoric of Pier Luigi Nervi; and the ethereal pragmatism of Buckminster Fuller."

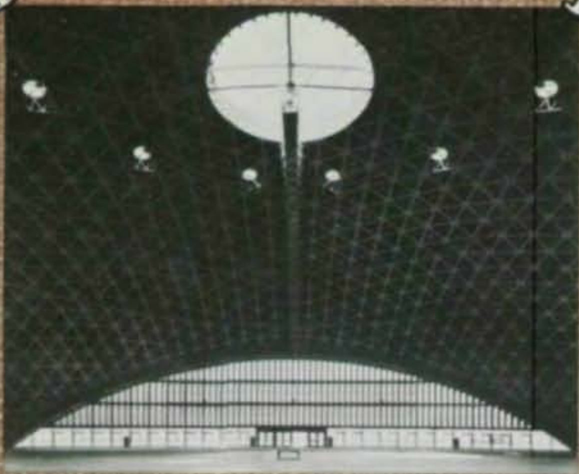
Photographs (left to right, top to bottom) courtesy of: Fay Foto Service, Inc.; Kawasumi; Fillers Research Foundation; Rudolph Eimke; United Press International; Austrian Information Service; Art Meyer.

Raw Sugar Storage Dome, Charleston, Mass.

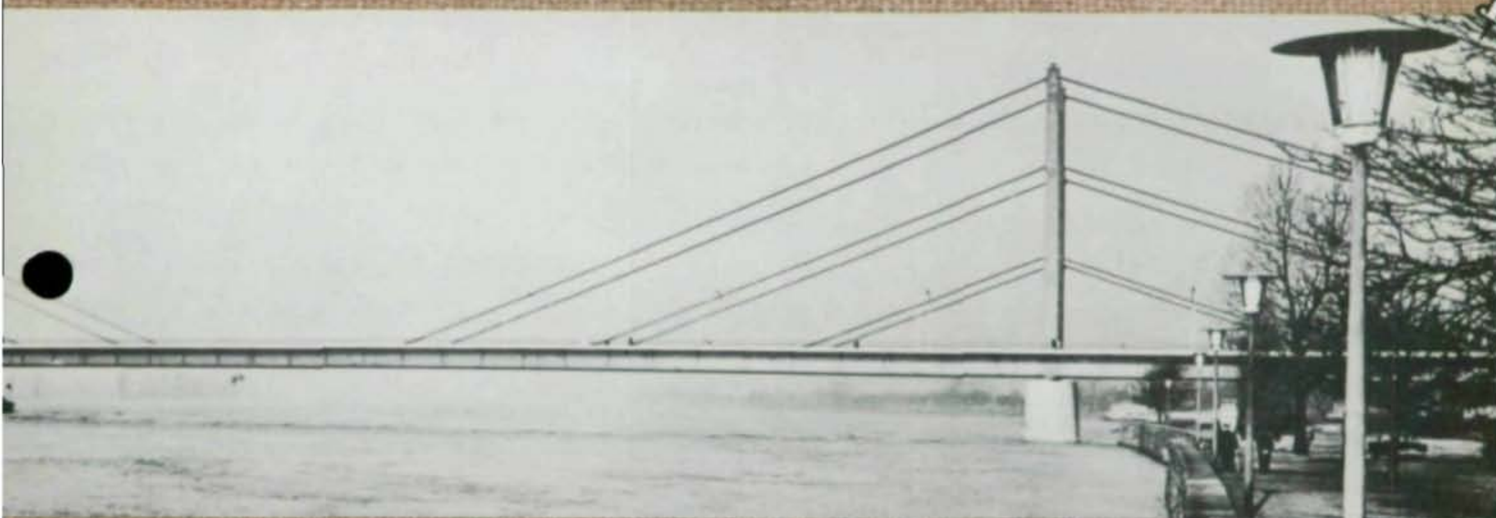


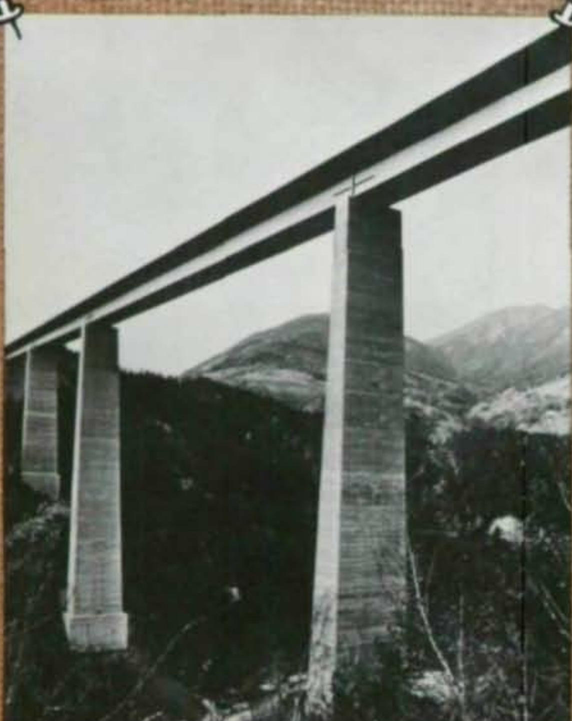
Verrazano-Narrows Bridge, New York City (detail on front cover)

WITH STEEL


Tokyo International Trade Center Exhibition Hall No. 2, Tokyo, Japan


Missouri Botanical Garden Climatron, St. Louis, Mo.


Theodor Heuss Bridge over Rhine River, Düsseldorf, Germany (detail)


Europa Bridge over Sill River, Innsbruck-Schoenberg, Austria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