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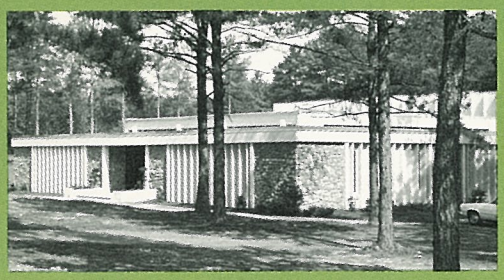
industrial buildings

Prestressed concrete offers seven ways to success in industrial building design

What determines a successful industrial building?

If a building designer can incorporate the following characteristics into the structure, the chances of it being a "successful" building are high:

- Low cost—prestressed concrete is able to provide savings in construction time, on-site labor, maintenance, and insurance costs, and often in initial material costs.
- Rapid construction time—precast or prestressed concrete will expedite construction time because it is cast in the plant while the site is prepared. After it is in place, other work can proceed immediately.
- Minimum maintenance—concrete's unique strength, durability and resistance to corrosive forces give it a higher wear-and-tear threshold.
- Production flexibility—Precast concrete elements are ideally adaptable and the long clear spans attainable allow a wide range of production layouts.
- Efficient space use—prestressed concrete roofs and frames providing long clear spans result in wide column spacings with unobstructed floor areas.
- Fire resistance—Concrete is the most fire resistant material, and no insulations need be attached. This means lower fire insurance rates.
- Pleasant working conditions—High worker morale is maintained by the infinite variety of precast concrete textures, colors, shapes, and designs.



THE COVER illustrates the Scott Foresman & Co. office and warehouse, Atlanta, Georgia. The project is featured on page 5 of this issue.

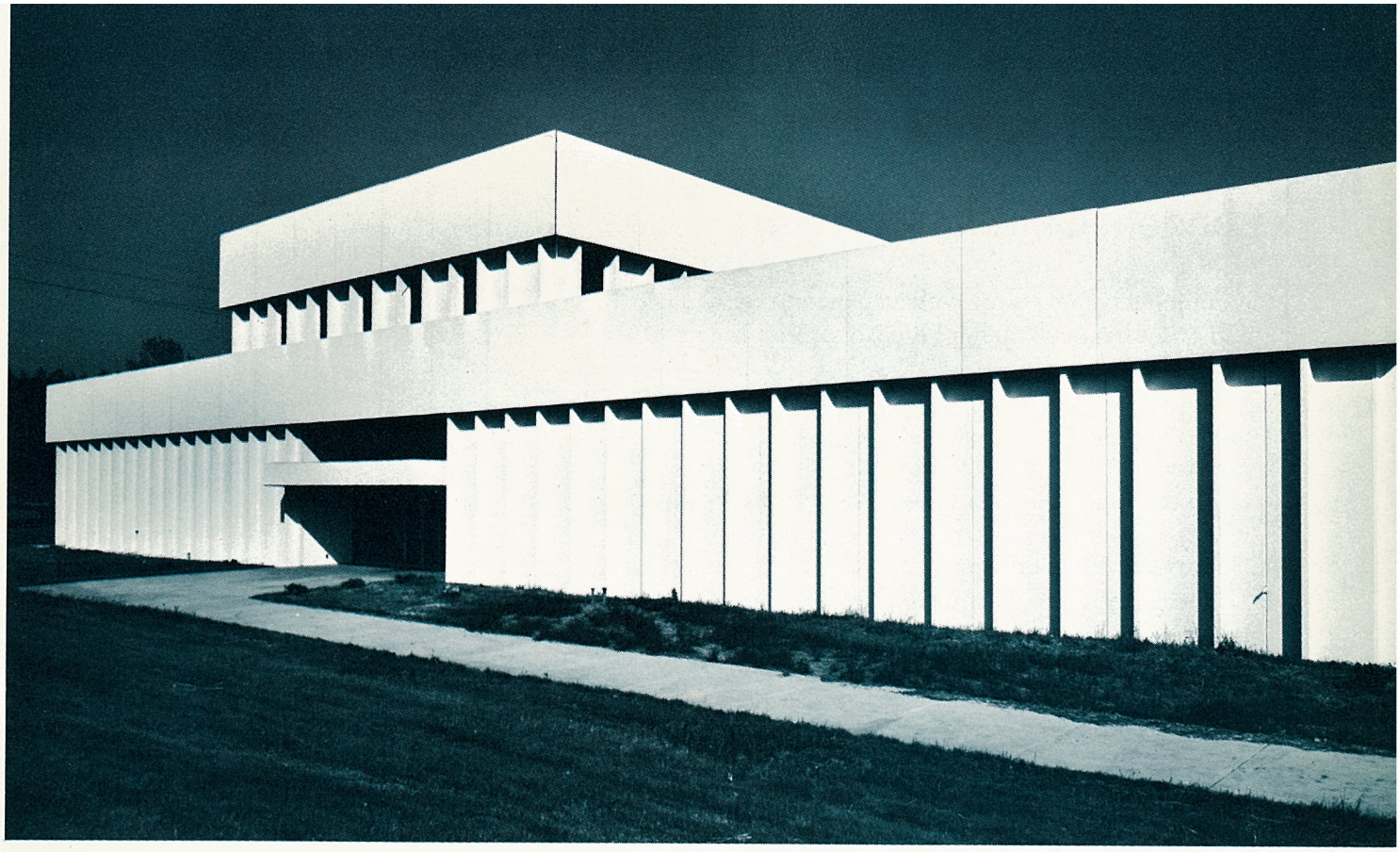
Exhaust Towers Motorola Integrated Circuits Center Mesa, Arizona

Four standard prestressed concrete single tees for each of three exhaust towers at Motorola's Integrated Circuits Center form an esthetic and beneficial solution to discharging exhaust into the atmosphere.

Each of the 34-ft. long tees are erected on end flange-to-flange to form a square shaft through which the purified exhaust flows. The towers are tall enough so the air exhausted can be dissipated into the atmosphere.

White cement, white sand, and white quartz aggregate were used in the tees, which were then sandblasted to expose the quartz.

Architects: Varney, Sexton, Sydnor, Associates; Structural Engineer: Magadini and Associates; General Contractor: T. G. K. Construction Co.; Prestressed Concrete: United Metro Materials & Concrete Co., Inc.



Baking Plant, American Bakeries Company Charlotte, North Carolina

American Bakeries Co.'s 175,000-sq. ft. baking plant in Charlotte is built totally of precast and prestressed concrete elements.

The framing plan is a simple precast column and beam system. Used in conjunction with the prestressed concrete double and single tee roof and office floor system, it allows greater spacing between columns to meet the requirements of the plant layout.

In addition, precast concrete double tees and flat panels are used to form attractive exterior walls.

Precast and prestressed concrete was used in the building for a number of reasons. For one, speed of construction obtainable with this material enabled large spaces to be covered quickly. This expedited the whole construction process, thereby reducing costs and getting the client into the building sooner.

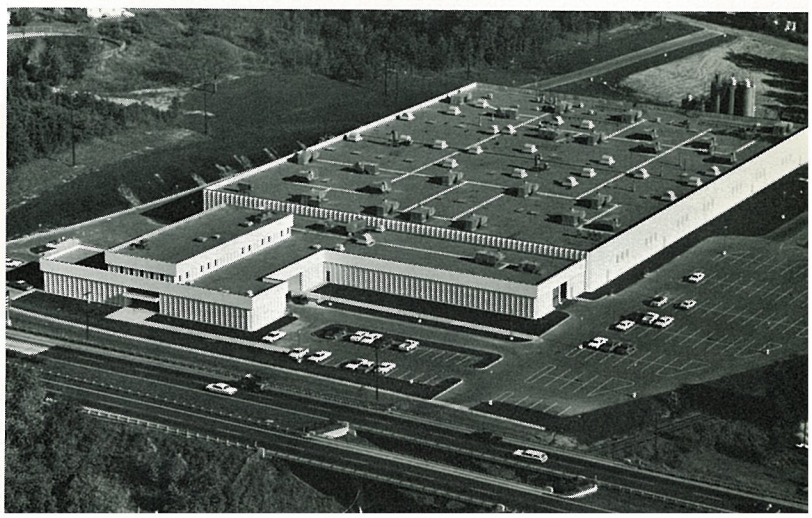
The roof had to be designed for heavy loads due to various types of mechanical equipment it had to carry. According to the architects, "the roof system works very well due to the inherent ability of prestressed concrete to span great depths and carry heavy loads."

The exterior wall components function as shear walls for lateral building support.

The architects also used prestressed concrete because it provides a ledge-free structure, easing maintenance and sanitation.

Part of the program for the plant calls for it to be expanded. The precast components on the exterior can be reused at that time.

Architects-Engineers: Stevens & Wilkinson; General Contractor: J. A. Jones Construction Co.; Precast-Prestressed Concrete: Concrete Materials Inc.



Warehouse and Office Building
Liquor Control Board of Ontario
London, Ontario, Canada

A completely precast prestressed concrete warehouse and office has been built for the Liquor Control Board of Ontario.

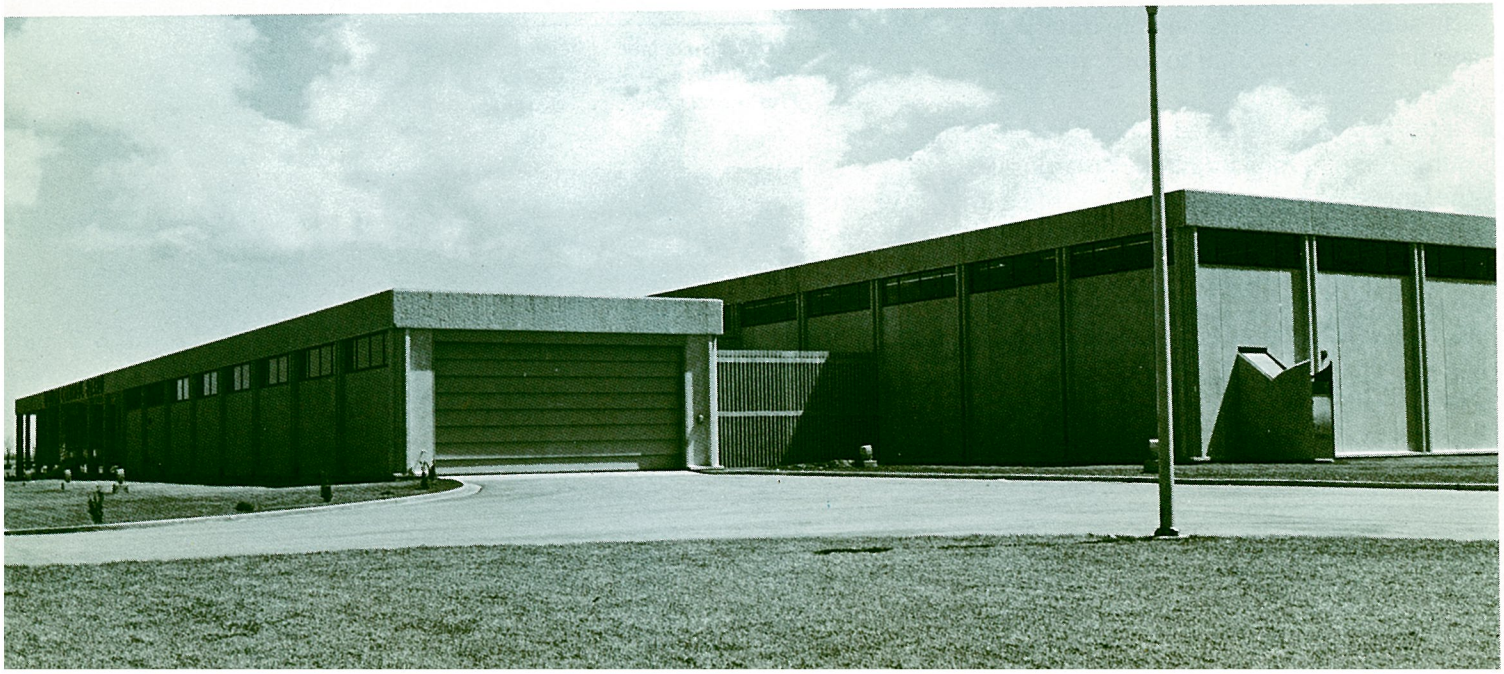
Precast concrete columns and V-beams support 298 prestressed concrete single tees forming the warehouse roof and 120 prestressed double tees forming the office roof. Precast fascia and wall panels combine with other miscellaneous precast units to fashion the exterior of the building.

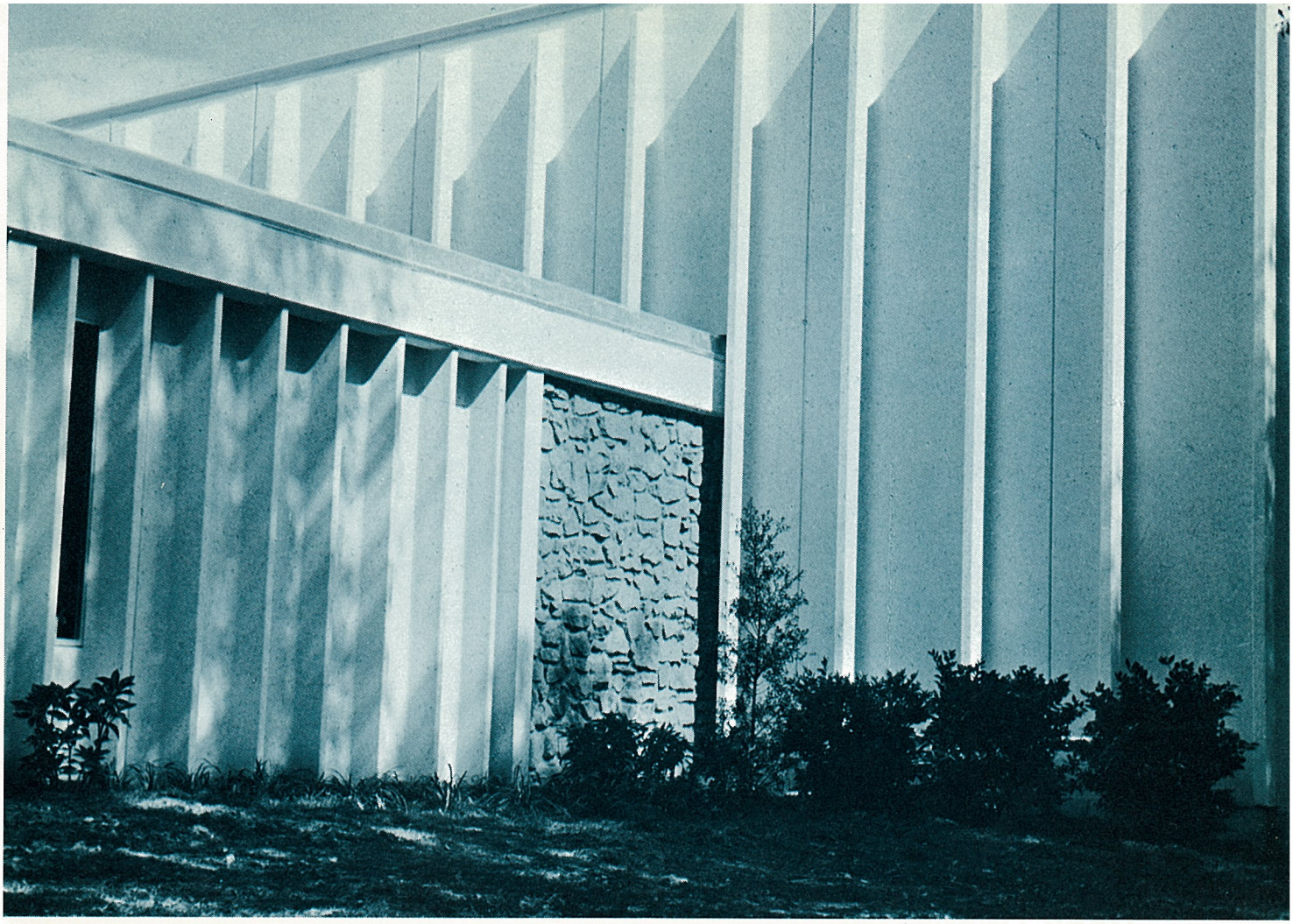
Precast prestressed concrete was chosen primarily to achieve long clear spans, allowing free storage and traffic areas, and to provide uncluttered surfaces free of projecting connections, ledges, and braces.

Special split precast columns and V-beams are designed to conceal all mechanical and electrical installations inside. This protects these components from normal traffic in the warehouse and facilitates clear, unobstructed movement under beams and stacking close to columns.

The warehouse is 500-ft. long and divided into 80-ft. bays, with column spacing every 20 ft. The split columns support inverted V-beams, which in turn support 80-ft. long, 10-ft. wide single tees. The walls are precast, exposed aggregate panels 10-ft. wide and 22½-ft. high. The panels may be removed for future expansion of the building.

Architects: Hicks, Marsh & McLean; Structural Engineer: B. A. Hastings Ltd.; General Contractor: Ellis-Don Ltd.; Precast Prestressed Concrete: Pre-Con Ltd.





Warehouse and Office Building
Scott Foresman and Company, Atlanta, Georgia

An almost totally precast prestressed concrete office and warehouse has been built for Scott Foresman & Co. in Atlanta.

Prestressed double tees 8-ft. wide and 22-in. deep span over the 40,000-sq. ft. warehouse and clerestory portion of the office. Double tees 14-in. deep cover the lower portion of the office roof.

The frame of the warehouse consists of prestressed concrete columns along the two side walls and double tee girders erected stems up. Double tee wall panels are hung from these girders. This arrangement allows removal and reuse of the panels during expansion.

Along the front and back walls of the warehouse, the 8-ft. wide double tee wall panels are load bearing. The panels are 28-ft. 10-in. tall. A ledge to carry the roof tees is cast in the back of the panels.

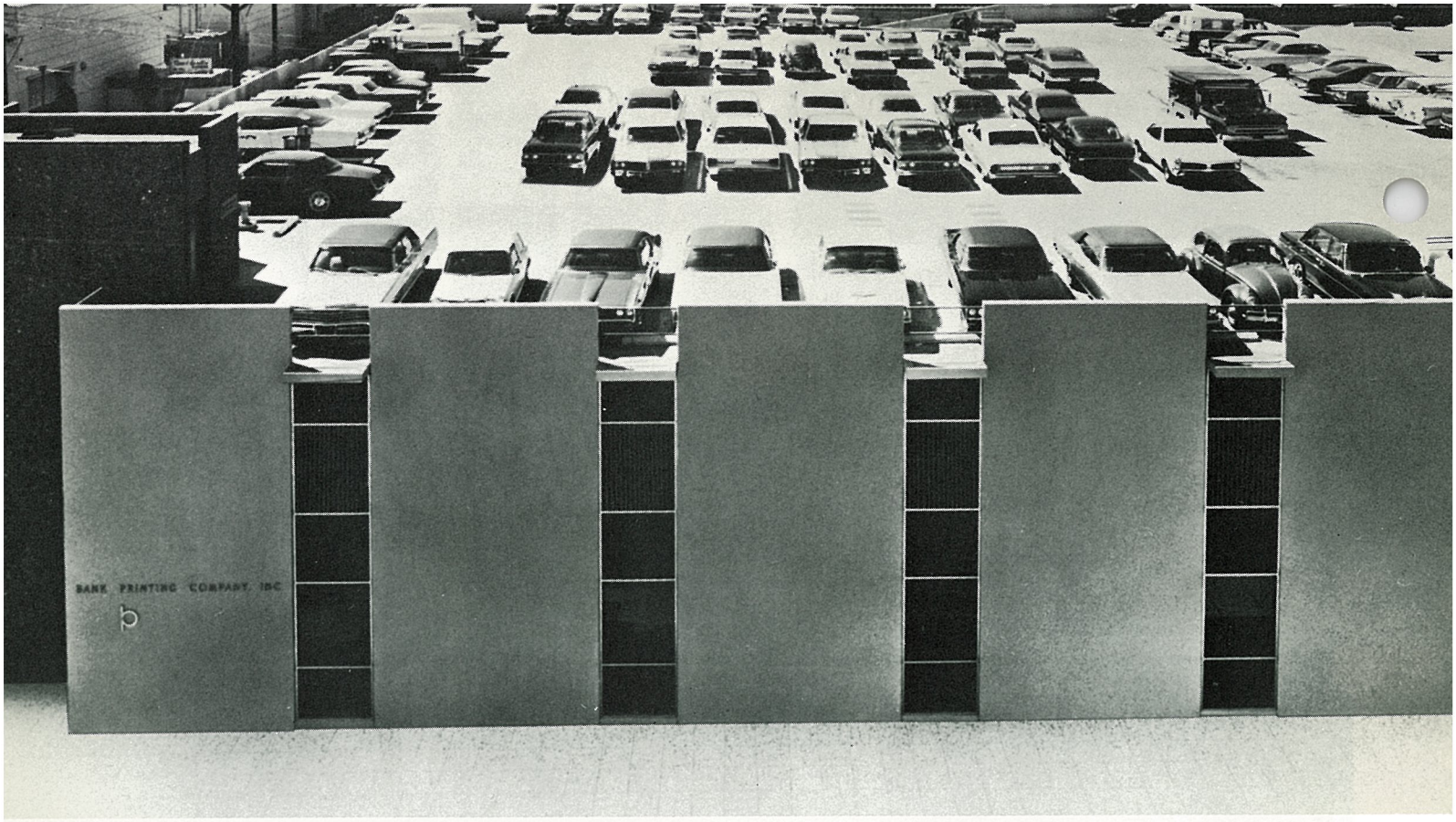
The office is framed with prestressed concrete columns and prestressed "L" beams, which carry the weight of the double tee roof and 4-ft. wide double tee wall panels.

The architect listed five reasons for selecting prestressed concrete for the project. Most importantly, Scott Foresman was faced with a loss of its existing leased space in a short time, so construction time was critical.

Their product (books) required excellent fire protection and established bay sizes to accommodate an existing stock handling system. Also, a winter construction schedule was faced, and the owner wanted to minimize maintenance.

Finally, cost estimates were made on several systems and materials, and prestressed concrete seemed the most economical.

Architect: Jack Richardson Frye; Structural Engineer: Ray T. Chalfant Jr.; General Contractor: Smith & Plaster of Georgia, Inc.; Prestressed Concrete: Concrete Materials Inc.



Plant, Office Building
Bank Printing Company, Inc.
Los Angeles, California

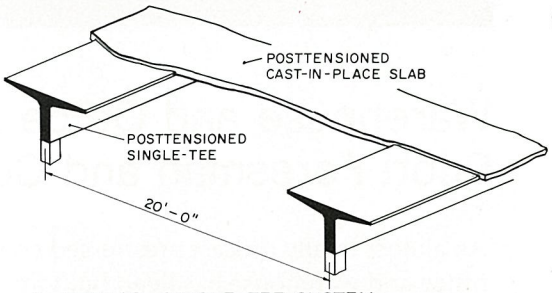
Maximum land use, low construction costs, and speedy erection were advantages gained by using precast prestressed and cast-in-place concrete in the plant and office of the Bank Printing Co., Inc.

By providing parking on the roof of the plant, the architects were able to use the entire existing site for the building, while solving the problem of providing on-site parking.

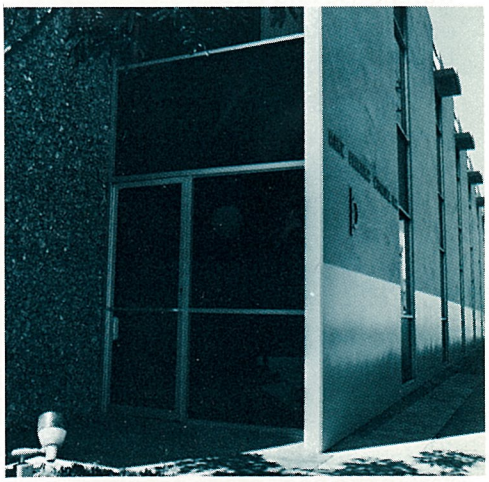
Repetitive use of standard concrete components such as prestressed single tees for the roof and precast wall panels had a significant effect on reducing overall building costs. The square foot cost was significantly below the Southern California average.

The 34,000-sq. ft. building was completed in less than six months. Contributing to construction speed was the use of the 50-ft. long single tees and exposed-aggregate wall panels.

A spread tee system combined with a post-tensioned cast-in-place slab provides the roof deck for the 89-car parking lot. This makes it water tight.



A. SPREAD SINGLE-TEE SYSTEM.



Architects-Engineers: T. Y. Lin and Associates; General Contractor: Donald F. Shaw; Post-Tensioning: Atlas Prestressing Corp.; Precast Prestressed Concrete: Interpace.

Warehouse and Office Building
Bayou News Agency, Inc., Baton Rouge, Louisiana

A triple A fire and storm insurance rating given to the Bayou News Agency's administrative offices and warehouse was the cardinal reason the architect chose prestressed concrete.

Precast concrete columns and beams and a prestressed concrete double tee roof system over the warehouse and precast channel slabs over the offices combine with concrete masonry walls. This combination enabled the owner to attain insurance premiums at least $2,700 a year less on the $225,000 structure than with other building materials.

The annual premium rates for the building are only $3.81 per $1,000 of insurance, while the rates on an all metal building would be $15.86 per $1,000 of insurance, according to the architect.

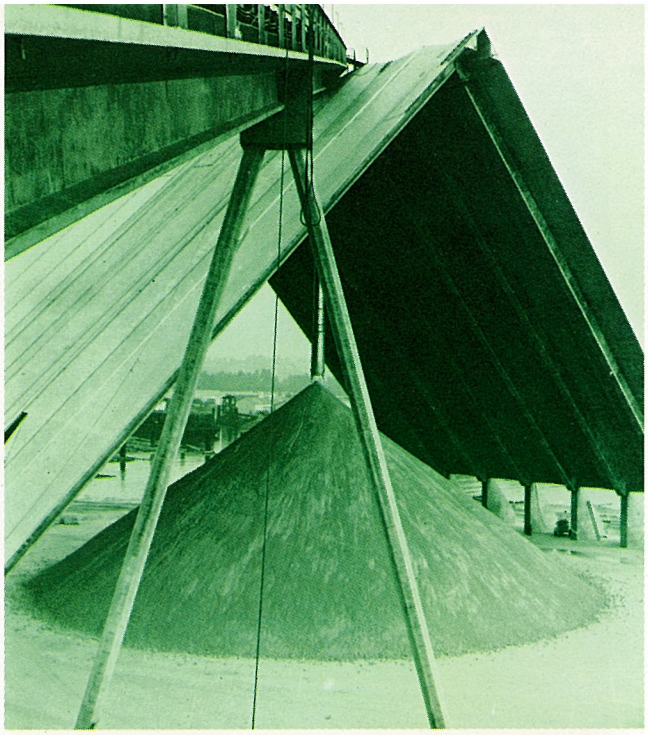
The architect also chose prestressed concrete double tees for the roof to achieve long clear spans. Voids between tee stems provide natural light in the warehouse of the magazine and book distribution agency.

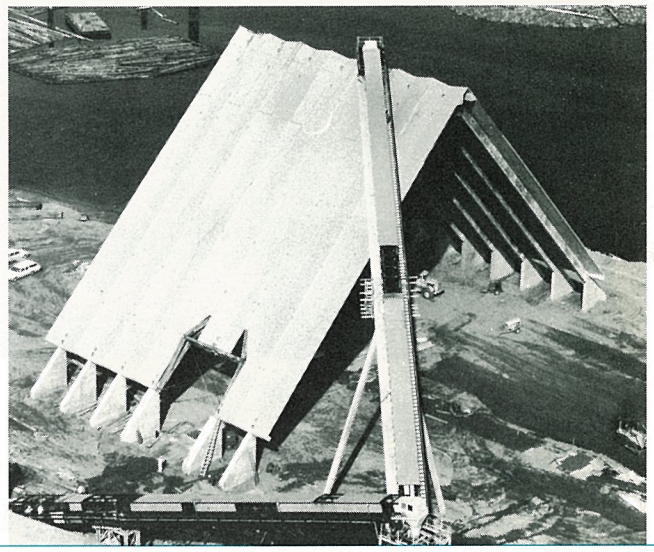
The building was designed to take advantage of standard precast and prestressed elements. Also, concrete's insulating qualities accounted for economical heating and ventilating systems.

The double tees are 8-ft. wide and 24-in. deep, spanning 60 ft. across the warehouse and 40 ft. across a mezzanine. The channel slabs are 4-ft. wide, 16-in. deep, and span 40 ft.

Architect: Frederick Charles Dupre; Structural Engineers: Rayner and McKenzie; General Contractor: Comeaux Bros.; Precast Prestressed Concrete: Louisiana Concrete Products, Inc.

Sulphur Handling Structure
North Vancouver
British Columbia, Canada





The choice of prestressed concrete for the sulphur handling structure for Vancouver Wharves Ltd. was very important because of the corrosive and inflammable nature of sulphur.

In addition, there was only a short time allowance for construction. The use of very large precast components also resulted in a cost competitive with other materials.

The structure is a high capacity stockpiling and reclaiming facility for Vancouver's port complex. It was built to act as a cover for a 40,000-ton pile of crushed dry sulphur.

Fourteen prestressed bulb tees 140-ft. long, 16-ft. wide, and 5-ft. deep are erected at a 45° angle. They are post-tensioned laterally in line with the three hinge joints.

Supporting a conveyor belt leading to the structure are two 11-ft. wide bulb tees resting on two 24-in. hollow octagonal precast piles and a precast cap.

Structural Engineers: Underwood McLellan & Associates Ltd.; Prestressed Concrete and Post-tensioning: Pacific Prestress Ltd.

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