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# Dead Load Reduction Obtained By Lightweight Concrete Helps Cut Costly Foundation Re- quirements For Florida's Gulf Life Building

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**H**ERALDED as the nation's tallest precast post-tensioned office structure, the new Gulf Life Tower became famous in architectural and construction circles before it was completed.

Rising 430 feet above a broad podium on the south bank of the St. Johns River in Jacksonville, Florida, the Tower is a bold, elegant example of architectural and structural design made possible by lightweight aggregate concrete.

Dead load reduction offered by structural lightweight concrete facilitated the architect's freedom to express lightness and grace, as well as the advanced engineering and construction techniques devised.

Foundation design was also important, since the building is supported above weathered limestone strata, 28 feet below grade. Weight reduction aided the design solution: large spread footings for the eight perimeter columns and central core, plus an elaborate dewatering system of well points, sand drains and piezometers.

Internal support (and resistance to wind forces) is supplied by a cast-in-place central core, 53 feet square, built progressively by slip-forming as the perimeter elements were assembled.

Spanning between this core and the precast exterior are lightweight concrete stressed double tees, alternating in direction on successive floor levels. Lightweight concrete topping above the double tees completes the floor framing.

On the exterior, the tower fully exposes its sculptured structural frame, supported by eight tapered con-

crete columns set at about third points on each side. Precast, segmented, post-tensioned concrete beams span the two columns at each floor and cantilever over 40 feet to the corners.

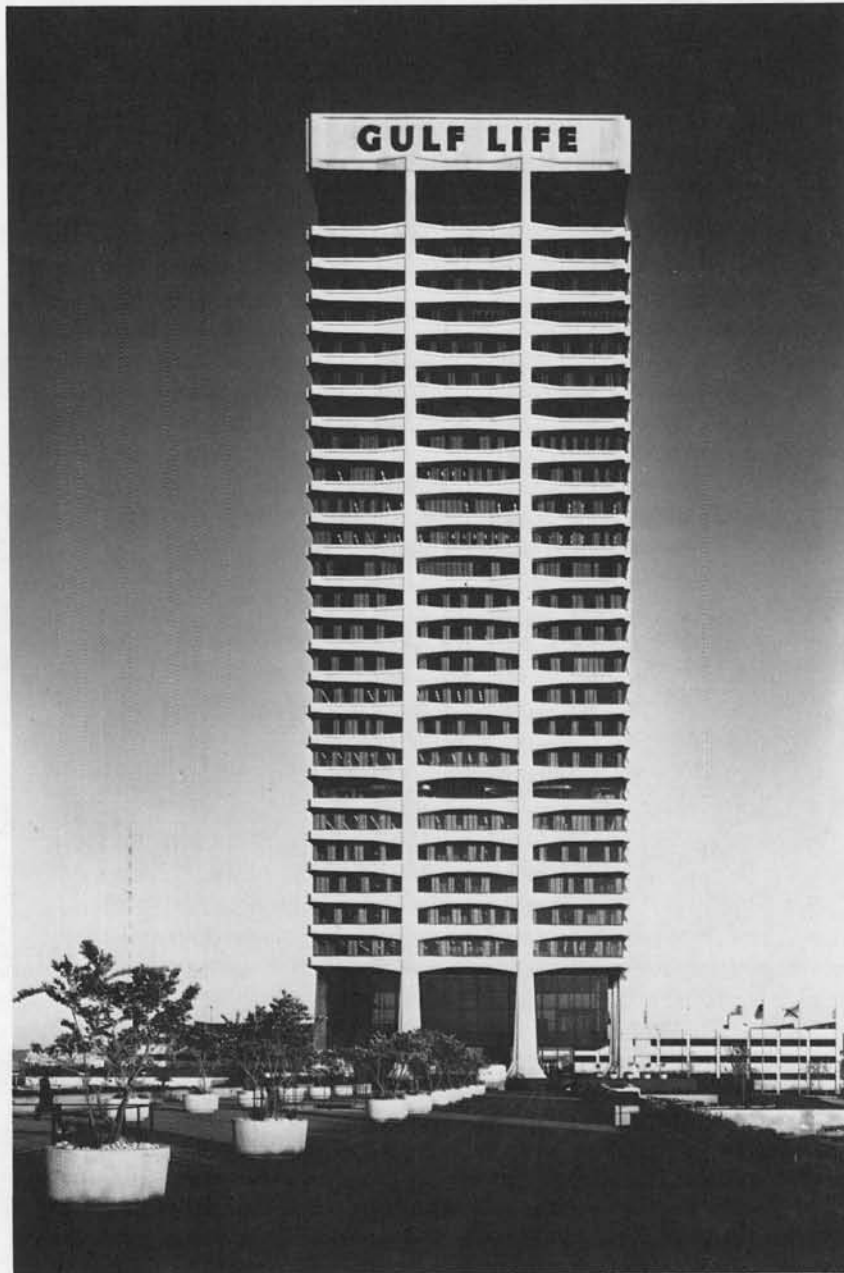
The eight exterior columns are composed of 6-inch thick, hollow concrete units. After positioning this shell and its reinforcing, lightweight concrete was cast to complete the support.

Each of the exposed structural floor beams is made up of 14 precast segments, strung together and tied to supporting columns by steel tendons. At the cantilevered ends, which form building corners, the beams are splayed to receive tendon bearing plates and allow jacking equipment to accomplish post-tensioning successfully.

Proper positioning of the 14 segments was important, since these beams and the columns became the finished fascia. An ingenious cantilevered "strongback" with a steel truss erection frame was designed to extend the full 143-foot width of a building side to support these elements.

Grouting the precast elements to become a continuous unit while retaining clear prestress strand conduit was the next phase of construction. Threading the 12 half-inch steel tendons through the conduit followed and the last major step was to apply tension. All tendons were pressure grouted in position.

Using exposed column and beam design fulfilled the architect's concept of unity and discipline in color, form and texture. The cantilevered beams allow unbroken



window walls of glass at corners, giving a full perimeter view throughout all floors. Thus the architect achieved his desire to express directly the multiple layers of work areas which make up a high-rise office building.

The Gulf Life Insurance Company's new headquarters is a focal point for its 12-acre Gulf Life Center with landscaping, plazas, and other buildings under way or planned. Located across the river from Jacksonville's municipal center, it represents a beachhead for renewal of the surrounding area.

*Editor's Note:* This article is an oversimplifying of the procedures involved and of the structural designs which solved architectural requirements.

The important thing to the industry is that the structure was made possible by the concept of the architect,

the ingenuity of the engineer, the willingness of the contractor to use new methods of construction, and the availability of quality lightweight aggregate structural concrete.

**Owners — Gulf Life Insurance Co., Jacksonville, Fla.**

**Architect — Welton Becket & Associates, Architects & Engineers, Los Angeles, Calif.**

**Associate Architect — Kemp, Bunch and Jackson, Jacksonville, Fla.**

**Structural Engineer — Richard R. Bradshaw, Inc., Van Nuys, Calif.**

**General Contractor — The Aucter Co., Jacksonville, Fla.**

**Precast Concrete — Concrete Materials of Georgia, Inc., Atlanta, Ga.**

**Prestress Concrete — Capitol Prestress Co., Jacksonville, Fla.**

**Ready-Mix Concrete — Capitol Concrete Co., Jacksonville, Fla.**

**Solite expanded clay aggregate furnished by Florida Solite Co., Jacksonville, Fla.**