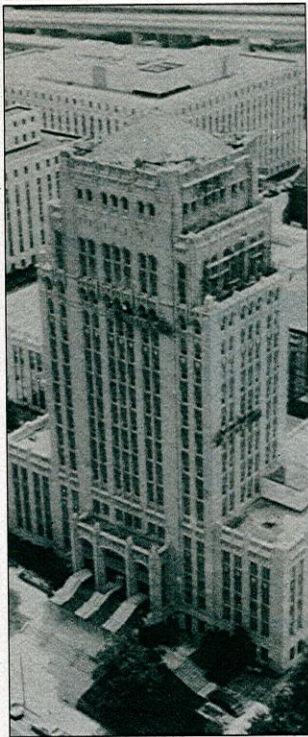


ENGINEERING APPLICATIONS



DESIGN FLAWS IN ATLANTA CITY HALL PUT ITS FACADE UNDER 20 TIMES NORMAL STRESS.

ATLANTA CITY HALL: BETTER THAN NEW

Even as the last block was placed for Atlanta City Hall in 1930, its facade was slowly beginning to self-destruct. The 12-story tower and its three-story base were designed without expansion joints, internal flashings or weep holes. The terra-cotta blocks facing the building were also inadequately supported: Z-shaped steel straps giving horizontal support to the blocks did not extend to the building corners, and steel shelf angles giving vertical support were omitted at the corners, too.

The deficiencies caused typical stresses of 300 psi in the affected blocks—compared to 10–15 psi under normal conditions. Vertical

displacement cracks developed between supported and unsupported sections, some extending from ground to roof. The cracks allowed moisture into the facade, corroding the shelf angles and the terra-cotta's anchors, and damaging the building interior. The terra-cotta cracked and in some places collapsed.

Besides the stonework crumbling and falling to the plaza below, the facility had another problem: It had long been undersized for the city government. The \$31 million solution includes a complete restoration of the building's facade, interior renovation and a U-shaped five-story addition, which was designed by a joint venture, Muldower-Jova/Daniels/Busby-Harris, Atlanta.

Western Waterproofing Co., Atlanta, did the exterior work. Crews cut through the tile roof to tie outriggers supporting the 32 ft wide scaffolding. Full-height expansion joints were cut into the corners, and Hypalon rubber strips were installed under the shelf angles at each floor. As crews made 4 in. cuts into the blocks in preparation for the expansion joints, stresses in the terra-cotta blocks were relieved.

The sudden change in forces often caused adjacent blocks to crumble. At the lower floors, where stresses were greatest, results were spectacular. "The blocks just exploded outward," says Sven Thomasen, project manager with Wiss, Janney, Elstner Associates, Emeryville, Calif., engineers for the restoration.

Instead of duplicating the

original material, Western refaced the building's 12 upper floors with high-strength polymer concrete from Silikal North America, Stratford, Conn. The 1,501 blocks each cost about half as much as their terra-cotta counterparts, which were used on the lower three floors.

City personnel moved back into the building in October 1990. With the additional space in the annex, a single building holds most of the city government for the first time in 40 years.

(CIRCLE 300 READER SVCE. COUPON)

VIRGINIA COUNTY GOES WITH CLAY PIPE

Like many parts of the county, Virginia's rural Henry County has been growing rapidly. With septic systems as the county's only form of sewage treatment, something had to be done before discharges from growing residential and commercial areas polluted the area's ground water.

After a series of public hearings, Henry County built the Lower Smith River wastewater treatment plant near Martinsville. Completed in January 1991, the \$15 million plant can treat 6 mgd and is expandable to a capacity of 12 mgd.

Three interceptors of 15–24 in. diameter bring wastewater to the plant. Some areas have a large proportion of highly corrosive industrial discharges. Where industrial sewage flows through the lines, the contractor, Prillaman and Pace Inc. of Martinsville,

chose pipe from the Logan Clay Products Co., Logan, Ohio. "Clay pipe is inert," says H. Leonard Mathews Jr., project manager with William C. Overman Associates, Virginia Beach, Va. "It isn't degraded by higher-strength waste."

(CIRCLE 301 READER SVCE. COUPON)

INDIANA PLANT HAS CONCRETE ADVANTAGE

Much of the wire mesh used to reinforce concrete floors at several Libby-Owens-Ford plants was improperly installed, with unsatisfactory results. "Wire mesh tends to end up on the ground, not in the concrete," says Larry Hay, executive vice president of Denham Blythe Engineers and Constructors, a consulting firm based in Lexington, Ky.

The new Libby-Owens-Ford glass-manufacturing plant in Shelbyville, Ind. has something better. Denham Blythe specified Caprolan-RC nylon 6 fibers from Allied-Signal Inc., Morristown, N.J. "The nylon fibers are entrained in the concrete, so there is no way that they can be installed improperly," says Hays. Independent laboratory tests show that at 1 lb/cu yd of concrete, the fibers can reduce plastic cracking by almost 60%, while doubling impact resistance.

The 500,000 sq ft facility contains 11,000 cu yd of concrete floors. The \$70 million plant went on-line in October of 1990 and can supply General Motors, Ford and Chrysler with 10 million pieces of automotive glass per year.

(CIRCLE 302 READER SVCE. COUPON)