

# Budweiser of Greenville Warehouse and Distribution Center Piedmont, South Carolina



Photo courtesy of Reel Video & Stills Inc./Brian Erkens.

In this design-build project, load-bearing precast concrete sandwich wall panels were used effectively to build an attractive two-story industrial warehouse and distribution center near Greenville, S.C.

The owner's requirements for a new beverage warehouse and distribution center were closely linked to the type of building material enclosure. The specific request was for a state-of-the-art facility with optimum product and process flow. In addition, modern cool storage and refrigeration features blended into a design that would ensure cost-effective, energy-conserving operations.

After discussion with contractors and consulting engineers, the owner soon came to the conclusion that to achieve thermal efficiency, the ideal building material for this project would be a precast concrete system and, more specifically, sandwich wall panels with high thermal resistance due to an insulation core.

To construct the facility, the owner entered into a design-build contract with Roebuck Buildings Co. Inc. of Roebuck, S.C., a general contractor with wide experience in constructing industrial buildings. The engineer of record was CMC Cary Engineering Consultants of Greenville, S.C., which was responsible for the structural design of the building.

To meet the requirements of the project, the contractor worked closely with the precaster, Metromont Corp., headquartered in Greenville, S.C. Together they designed a loadbearing, thermally efficient, precast concrete wall panel system for:

- The building envelope;
- An interior cool storage area;
- An interior drive-in refrigerator;
- An exterior office; and
- An exterior maintenance building.

The two-story 138,000 ft<sup>2</sup> (12,800 m<sup>2</sup>) facility is rectangular, with the office section jutting out in front. The frame of the building is almost entirely made of precast/prestressed concrete. For the foundation, reinforced concrete strip footings were used. The precast surface area comprised about 120,300 ft<sup>2</sup> (11,200 m<sup>2</sup>).

The breakdown of the sandwich wall panels was as follows:



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- Insulated flat wall panels (office): 28,807 ft<sup>2</sup> (2700 m<sup>2</sup>);
- Insulated flat wall panels (loading dock): 10,534 ft<sup>2</sup> (980 m<sup>2</sup>);
- Insulated flat wall panels (R-18): 29,843 ft<sup>2</sup> (2780 m<sup>2</sup>);
- Insulated flat wall panels (R-15): 43,033 ft<sup>2</sup> (4000 m<sup>2</sup>); and
- Insulated flat wall panels (R-26): 8088 ft<sup>2</sup> (750 m<sup>2</sup>).

Altogether, 301 precast concrete components were used from about 1850 yd<sup>3</sup> (1400 m<sup>3</sup>) of concrete. The insulated sandwich wall panels were prestressed.

The design concept was to use as high a thermal resistance (high R-value) as practical. The precast concrete walls had R-values ranging from R-26 (used in the cooler that stores draft beer) to R-15 (for the entire warehouse, which is conditioned to maintain product fresh-

ness). About 360 ft (110 m) of one side of the facility is designed for removal and expansion.

Thermally efficient precast concrete sandwich wall panels achieve high R-values because of concrete's thermal mass and the center wythe of insulation. In this project, low conductivity, non-corrosive, composite wythe connectors were used for shear transfer, connecting the inner and outer concrete wythes to yield a 100% composite panel.

By specifying composite connectors for the precast concrete sandwich wall panel system, the design team was able to eliminate solid zones of concrete in the insulated sandwich panels and reduce thermal breaks by eliminating steel connectors between concrete wythes. As a composite panel, the precast concrete and insulation delivered their

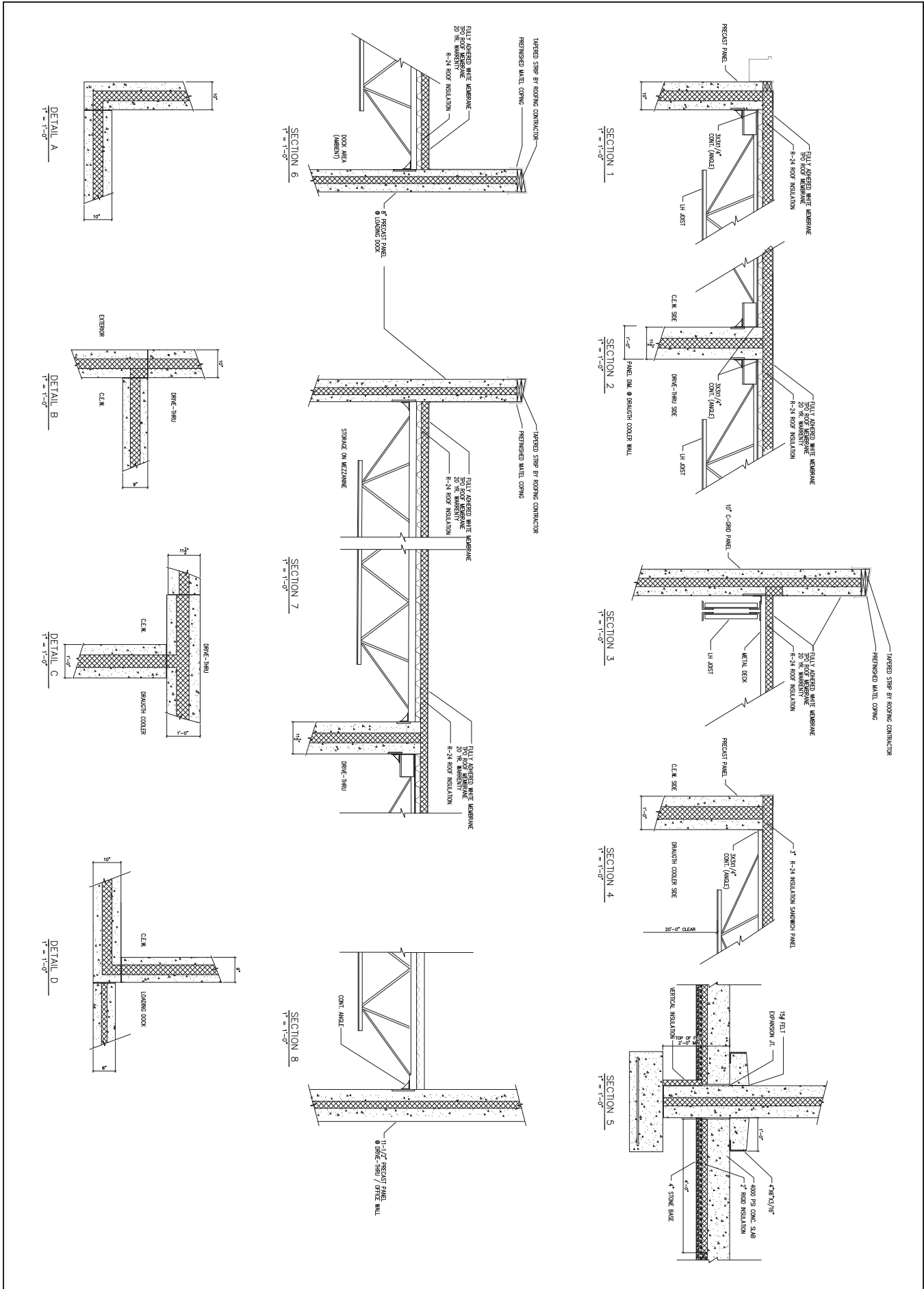




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inherent benefits, including durability, fire resistance, aesthetic forms and finishes, high R-values, and thermal mass effect of the concrete.

CMC Cary Engineering Consultants detailed special steel-to-precast seat connections. These complicated connections were designed to resist wind uplift and shear diaphragm force transfer and allow for code-required firewall breakaway capabilities.

In addition to the state-of-the-art warehouse and refrigeration space, precast concrete was used for the executive office, training area, and sales room. The two-story area complements the high-bay warehouse/distribution area. Large two-story, arched window openings provide a high-end executive touch. Upon entering the front

doors and lobby, there is an impressive two-story atrium with stairs leading to the second level.

The precast concrete reveal pattern on the exterior is complemented by the corresponding window mullions. This cost-effective level of detailing clearly shows a versatility of precast concrete that is not commonly found in the architecture of this type of facility.

The precast wall panels were manufactured by Metromont Corp. at its plant in Greenville, S.C. Fabrication of the panels started in October 2004 and lasted through the winter. The products

were transported by tractor trailer to the project site, a short distance of about 20 miles (30 km). Erection of the panels took only seven weeks.

The project was completed in mid-2005 and was occupied shortly thereafter.

The total cost of the project was about \$10.6 million.

The design/build team was able to meet and even exceed the owner's requirements by working closely with the precaster early in the design process. The result is an attractive warehouse and distribution facility that the owner can maintain and operate at a low cost.

All parties concerned (owner, engineer, contractor, and precaster) are pleased with the new facility, and the company's staff is enjoying the new premises. Even visitors like the layout of the facility. The design-build construction method worked well in practice.

## CREDITS

**Owner:** Budweiser of Greenville; Piedmont, S.C.

**Architect of Record:** Jerry W. Rives Jr. AIA; Roebuck, S.C.

**Engineer of Record:** CMC Cary Engineering Consultants; Greenville, S.C.

**General Contractor:** Roebuck Buildings Co. Inc.; Roebuck, S.C.

**Precaster:** Metromont Corp.; Greenville, S.C.

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