

Al Meiklejohn Elementary School

Arvada, CO



Team

Owner:

Jefferson County School District
Lakewood, CO

Architect:

SlaterPaull Architects, Denver, CO

Engineer:

Anderson & Hastings Consultants Inc.
Lakewood, CO

General Contractor:

Saunders Construction Inc., Centennial, CO

Reinforcing Bar Fabricator:

Barton Supply Inc., Aurora, CO

Total Project Cost:

\$10 million

Total Project Size:

68,000 sq ft

Photography:

SlaterPaull Architects, Denver, CO

STRUCTURAL FRAMING SYSTEM

When voters passed a \$300-million bond issue in Jefferson County, Colo., school administrators wanted to produce results quickly and set the tone for later construction, to show citizens that their money would be well spent. To do so, they used a modified design-build system with a fast-track schedule. To accommodate this system, load-bearing, reinforced concrete, tilt-up panels were used for the structural system. The panels helped meet the schedule for the project that was designed and constructed in less than 18 months.

The winning architect-builder team evaluated a variety of systems, including concrete masonry units with brick veneer, steel frame with brick veneer, and concrete masonry units alone. The reinforced concrete tilt-up panels proved to be the quickest and most cost-effective solution.

UNIQUE DESIGN FEATURES

The load-bearing walls provide superior durability and strength and ensured fast construction, even when a critical change was made after the project was well into the design-development phase. Because the site conditions had expansive soil that can cause significant structural damage, administrators decided to alter the floor structure from slab-on-grade to a structural floor system. This change required major design adaptations for the reinforced concrete tilt-up wall panels.

The wall panels incorporated bracing to deadman anchors and a variety of embedments to provide load transfer to the three levels of structural flooring. The system required designers to create 165 panels, with no two alike due to placement of the more than 5,000 embedments, sloping to accommodate roof or flooring lines, and drainage. Because there was no floor slab for casting panels, 70,000 square feet of casting beds were required on site to create the reinforced concrete panels.

No special reinforcing bar or layout techniques were required to provide proper reinforcing for the panels or flooring, with grade 60 reinforcing bar used. Because of the unique and complicated layout of the embedment plates within the reinforcing bar mat, special attention was afforded to the concrete mix in the wall panels. The selected mix was a high-slump, fluid mix to ensure its flowability around the reinforcing steel and embedments, thus avoiding the potential for voids.

REASONS FOR CHOOSING REINFORCED CONCRETE

This tilt-up project was the first such project of this type for school districts along Colorado's Front Range, and has garnered several awards from architectural and construction groups. The design has proven so successful, other districts have taken notice and are now using reinforced concrete tilt-up panels in their projects. The contractor recently began working on one such project for Denver Public Schools.

High-slump concrete was used to ensure a fluid mix to fill around the multitude of embedments and reinforcing bar.

CRSI Concrete Reinforcing
Steel Institute

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