



Content contributed by the Clyfford Still Museum (www.clyffordstillmuseum.org), Martin Marietta Materials (www.martinmarietta.com), Petr Masek Photography (www.masekphoto.com) and Jeremy Bittermann Photography (www.bittermannphotography.com).

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Clyfford Still Museum

Denver, Colorado



Sika Corporation
201 Polito Avenue
Lyndhurst NJ 07071
Tel: 800 933 7452
Fax: 800 294 6408
www.sikausa.com

Sika Canada Inc.
601 Delmar Avenue
Pointe Claire QC H9R 4A9
Tel: 514 697 2610
Fax: 514 694 2792
www.sika.ca

Sika Mexicana S.A. de C.V.
Carretera Libre Celaya Km. 8.5
Fracc. Industrial Balvanera
Corregidora Queretaro C.P. 76920
Tel: 52 442 2385800
Fax: 52 442 2250537



Clyfford Still Museum

- Construction Period: 6.1.2010 – 9.14.2011
- Engineer: KPFF Consulting Engineers
- Contractor: Saunders Construction Inc.
- Concrete Supplier: Suburban Ready Mix



The Clyfford Still Museum encompasses a two story 28,500 square foot structure made of highly textured and resurfaced concrete that modifies light on both the exterior and the interior.

A cantilevered canopy of concrete leads patrons into the first floor lobby and a glass wall allows visitors to see into the conservation studio and collection storage. An open corridor is dedicated to educational materials, and its two story expanse provides views from below of the second floor galleries and views from above into the library and study areas on the first floor.

The second floor consists of a series of eleven distinct galleries, with ceilings of varying heights and proportions designed for optimal viewing of the elements in the Still collection. The galleries, totaling approximately 10,000 square feet, feature exhibits from throughout Clyfford Still's career and will enable visitors to progress chronologically through his works.

A daylight system equipped with diffused skylights and motorized shades is situated above a custom-formed, surprisingly delicate, concrete tracery ceiling that virtually disappears in the scattered light.

The Challenge

Maintaining color consistency throughout the entire 4800 cu.yds. of highly architectural concrete, while achieving extreme aesthetic requirements was a major challenge on site. The structure utilizes an extensive number of surface types, finishes and textures in the walls, ceilings and floors. Various elements need to match in color and consistency from placement to placement, while remaining relatively defect free.

- Concrete Volume: Approximately 4800 cu. yds.
- Conventional Concrete: Approximately 500 cu. yds.
- Specialty Concrete: Approximately 3500 cu. yds.
- SCC concrete: Approximately 800 cu. yds.

The Preparation

Concrete preconstruction, planning, trial mixtures and mock up placement tests for the Clyfford Still Museum started in January of 2009. Numerous trial mixtures were created by Martin Marietta utilizing various cement and fly ash types, coarse and fine aggregate sources, admixtures and physical properties of concrete.



The trial mixtures and samples evolved into larger mock up samples that were evaluated by the entire construction team for consistency and reproducibility over time on the project. To ensure that the desired consistency and surface finish



could be produced repeatedly, several full scale 30' tall mock up placements were constructed in the Martin Marietta Ready Mix yard duplicating the entire placement sequence from loading the trucks, to pumping the concrete, sequencing the trucks, and stripping and cleaning the placements as they would occur on site. In conjunction with the batch plant testing an onsite mock up structure was constructed from floor to ceiling to demonstrate the architect's vision, giving the owner and potential donors a more realistic view of the Clyfford Still Museum experience.

Each mock up was reviewed and discussed with the architect and construction team prior to placement and post placement to ensure that the aesthetic requirements had been met.

The Mix Design

The final mix design constituents were chosen based on the performance in the mock up placements and the availability of each constituent for the duration of the project. The concrete contains a blend of cement from Wyoming and Texas. The aggregate source is a river deposit that contains "no pink" aggregate.

A number of concrete admixture combinations had to be used throughout the course of the year to make sure that concrete performance was not affected by various external conditions. A



combination of highly performing water reducing admixture, Sika Viscocrete 2100, with hydration stabilizer, SikaTard 440, ensured prolonged workability during the hot summer months. Fast setting polycarboxylate based high range water reducer, Sikament 686, in combination with a non chloride accelerating admixture, Sika Set NC, provided the required set whenever ambient temperatures were low. Martin Marietta Ready Mix paid extreme attention to consistency and quality assurance with focus on constant water cement ratios and fluidity of the concrete. Plant and jobsite monitoring during production and construction assured the color, texture, stability, and consistency required. All on site adjustments with regard to slump and flow were accomplished through the use of VisoCrete 2100.

The Implementation

During the planning stages for the project it was determined that all of the concrete would be placed utilizing a concrete pump. The exterior 43' walls for the structure needed to be placed without lift lines or construction joints. The forming system chosen for the project only allowed for concrete to be placed in specific measured lifts, because of this the load sizes varied to match the lift heights depending on the overall wall size. The slump requirement of the concrete used for walls is between 8 – 10", the concrete was vibrated internally and externally to



meet the required finish with minimum surface defects. The entire concrete structure consists of unique board form finishes from smooth to rough and from minor to drastic surface textures. Self consolidating concrete (SCC) is utilized for translucent concrete ceiling, which filters the ambient light and creates desired visual effects in numerous exhibitions halls. This delicate concrete tracery ceiling virtually disappears in the scattered light.