United Arab Emirates Project

by Sean Lanham

If the Monolithic Dome that went up halfway around the world in the United Arab Emirates is any indication, this unique type of architecture could do for concrete placement what cars did for Detroit. UAE's Gulf Cement Company picked Dome Technology of Idaho Falls, Idaho, to build its massive storage building. This turned out to be a wise decision on a number of levels.

Nobody will ever accuse the folks at Dome Technology of foot dragging. They set a Monolithic Dome record when an astounding 240 yd^3 (190 m^3) of shotcrete was applied with one five-man work crew during one 12-h period. A Schwing Model RD 18 concrete pump with 2 in. (50 mm) diameter hose was used to establish the world mark.

Gulf Cement is the UAE's biggest single-stream cement company. It produces 1.25 million tons (1.1 x 10^6 metric tons) annually of clinker. (Clinker is ground to make cement powder.) Not surprisingly, the firm looked long and hard when choosing what type of storage facility it wanted to build.

The design selected was a huge dome silo with a storage capacity of 127,000 tons (115,000 metric tons). Construction of the massive facility was begun in late 1998, and the project was finished the following March.

As for the specs on the UAE dome, the circular foundation has a diameter of 200 ft (61 m), and the structure rises to a height of 130 ft (40 m). The plan included a concrete foundation and Monolithic Dome shell, four reclaim tunnels, along with an entryway with a hydraulic bulkhead door. Dome Technology worked in conjunction with Acteo General Contracting Co., Ltd. in the construction of the foundation, dome, and tunnels.

Figure 1: Aerial view of the inflation of the Airform for Gulf Cement in the United Arab Emirates. This massive structure covers a total surface area of 81,681 square feet and measures 200 x 100 ft. It has a 30-ft stemwall, making it 130 ft in total height. It took a 63-man crew only three months to spray 6000 tons of concrete to complete the project.

The design of the arch-shaped reclaim tunnels provides users with substantial efficiencies. This tunnel system reclaims four-fifths of the clinker by gravity feed, with loaders picking up the remainder. The project's dome architecture resulted in further economic advantages for the client. Material savings was one big example. The dome roof used 40% less steel than a steel roofed RC silo of similar size would have required.

All told, the project required 3000 yd^3 (2300 m^3) of shotcrete and 1 million lb (454 metric tons) of rebar. But it took the 63-man crew only three months to complete the job.

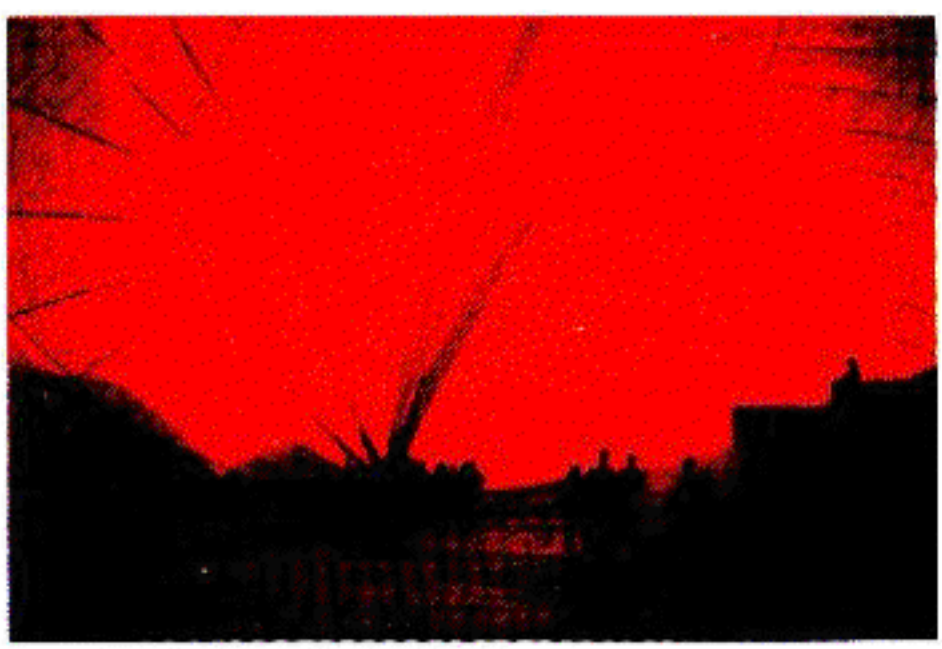

Figure 2: Workers unroll the 200-foot Airform for Gulf Cement in the United Arab Emirates during inflation.

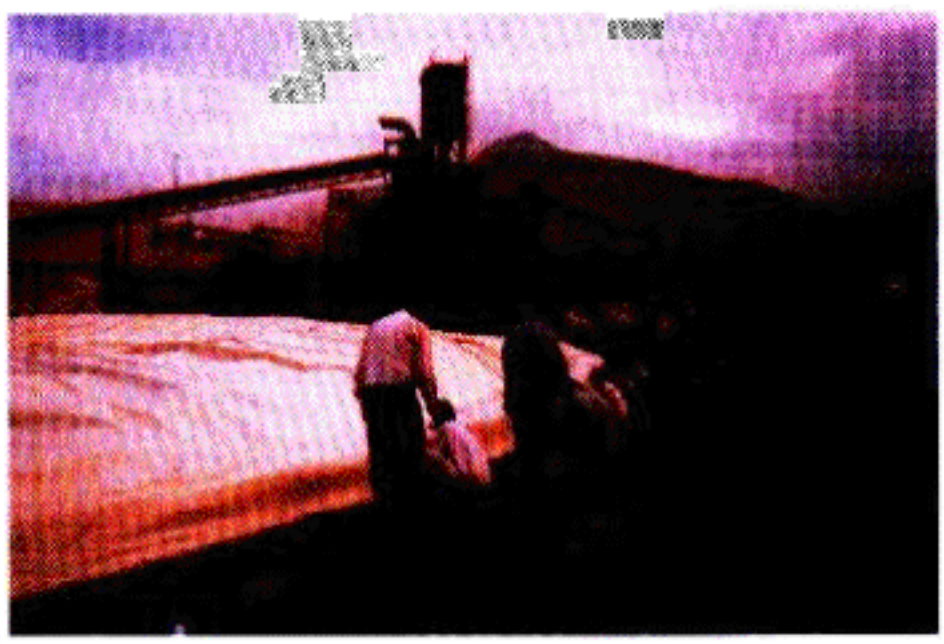

Figure 3: A large crew makes a final check on the attachment of the Airform to the footing for Gulf Cement in the United Arab Emirates.