Soil-Cement FOR THE ENVIRONMENT

STRONG, ECONOMICAL, DURABLE, IMPERMEABLE

PCA
PORTLAND CEMENT ASSOCIATION

Equalization Ponds

Riverside Water Reclamation Plant, Riverside, California

Constructing soil-cement liner.

The city of Riverside has upgraded its wastewater treatment facility from secondary to tertiary treatment. The plant capacity is also being expanded from 25 million gallons per day (MGD) to 29 MGD. These improvements include the construction of two soil-cement-lined equalization ponds. A third soil-cement-lined pond will be added later. These ponds will serve as temporary storage for secondary effluent to prevent hydraulic overload of the tertiary filters. Each pond is 250 ft (76 m) long, 125 ft (38 m) wide, and an average of 10 ft (3 m) deep. The soil-cement lining consists of a single 8-in. (200-mm) compacted layer on the side slopes and two 8-in. (200-mm) compacted lifts along the bottom.

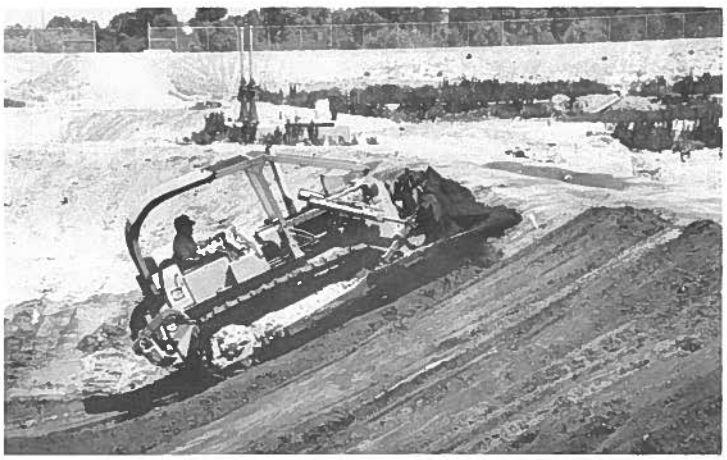
The general contractor for the project, a joint venture of Morley/Ziebrath & Alper, Los Angeles, excavated the ponds. A portion of the excavated sandy material was stockpiled for later use in the soil-cement.

Specifications allowed the soil-cement to be central plant mixed or mixed in place. The soil-cement contractor, Soil Stabilization Mixing Co., Chino, Calif., chose the mixed-in-place option. The stockpiled sandy soil was hauled in and spread on the floor of each pond. Next, cement was uniformly distributed over the soil and thoroughly mixed with an in-place rotary mixer. Cement content was 8% by weight. Water was added during the mixing operation to bring the mixture up to optimum moisture content. The mixed soil-cement was then pushed up the steep 2:1 side slopes by a D-6 bulldozer equipped with a U-blade. After the soil-cement was placed, it was compacted to a minimum of 95% of maximum density by a vibratory sheepsfoot roller, followed by a grid roller. Both rollers operated off a steel cable connected to a side-boom dozer working on top of the embankment.

Due to rapid drying conditions caused by the high temperature, wind, and low humidity, the soil-cement was periodically sprayed with water before and during compaction to maintain the moisture content near optimum. The finished compacted slopes were then sprayed with an asphalt emulsion to facilitate curing by sealing in the moisture. After the slopes were completed, the bottom of each pond was lined with 16 in. (400 mm) of soil-cement constructed in two 8-in. (200-mm) lifts.

Constructed in June 1980, the soil-cement lining took only five days to complete. The ponds are expected to be in operation this summer.

Camp, Dresser & McKee, Pasadena, Calif., designed the plant improvements and expansion. John R. Byerly, Inc., Bloomington, Calif., a geotechnical consulting firm, designed the soil-cement mix and performed the quality control tests during construction.



Placing soil-cement on slope.

Compacting soil-cement with vibratory sheepsfoot roller

Keeping soil-cement moist prior to compaction.

PORTLAND CEMENT ASSOCIATION

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