



Pinnacle Engineering



Unique hands-off, low maintenance “V” trench system developed for a concrete finishing process.

Pinnacle engineers developed a unique hands-off system that revolutionizes the wastewater treatment process for the finishing operation. The system provides a much easier, cost efficient method of cleaning the bays, while improving air quality and reducing employee exposure to hazards. A summary of the project follows:

Wastewater Treatment for Concrete Finishing Operation—Project Summary

As a part of a facility expansion, a manufacturer of architectural concrete panels needed to consolidate its finishing operations into one facility. Finishing operations include: sand blasting, acid etching, and washing of concrete panels. Previously, finishing was conducted in an open-air facility, using a poorly accessible pit for initial solids collection and a storm water pond for solids clarification and retention. *This setup exposed employees to unnecessary chemicals, fumes, and waste solids, as well as being labor intensive and costly to maintain.*

Client Needs

Pinnacle Engineering was contracted to provide the engineering and project management responsibility for the wet portion of the project. Working with the client, Pinnacle helped to set the following project goals:

- Reduce employee exposure to hazardous materials;
- Eliminate unnecessary waste solids handling;
- Reuse water where possible and cost effective; and
- Produce a wastewater effluent that met state and local discharge limits



Project Design

Design of the project required addressing air quality concerns; chemical hazards involved in solids collection and removal; and improving wastewater quality for normal sewer drainage. The design in-



corporates the following concepts.

Improved Ventilation: Air exhaust is provided through floor level vents that remove acid mists from the application bays. Eight air changes per hour are continuously provided while acid application or cleaning is occurring. Acid mist in the exhausted air is removed via a scrubber and mist eliminator.



The high air exchange rate also improves visibility and reduces the corrosive effect of the acid mist on building materials.

Innovative Solids Collection: In another finishing facility, one of the main labor costs was due to solids collection and removal. Sand, aggregate, and fines collected in the trenches, pits and tanks. Weekly, employees would hand shovel these areas to remove the accumulated solids.

Our design at this facility used unique, highly sloped, “V” trenches. The trenches are continuously flushed with recycled water via an in-trench spray header and nozzles.



In addition, the tanks in the wastewater treatment system include conical bottoms with a 60° cone, *allowing easy drainage and control of waste sediment.*

Low-Maintenance Wastewater Treatment: Wastewater treatment includes a 2-stage pH adjustment and solids removal. Sulfuric acid and sodium hydroxide are used to adjust the wastewater pH. After pH adjustment, solids are removed in a filter press. The





clear effluent from the filter press is then clean enough for direct discharge to the sewer. The entire wastewater treatment system operates with minimal operator attention. Filling raw material tanks and filter press cleaning are the main tasks and typically require less than 10 hours per week.

Project Management

Pinnacle's initial project cost for the purchase and installation of the wastewater treatment system, floor trenches, and scrubber system was estimated at \$339,000. The project was completed on schedule and more than 10% under budget.

After start up, one problem developed with the filter press. The press was blinding prematurely. When cleaning the original filter clothes, as well as installation of new filter clothes, did not resolve the problem, the original wastewater profile was reviewed. It was determined that the wastewater generated contained higher concentrations of very fine solids. The filter press programming was modified to allow pre-coating, at no-charge to the client, thus resolving the problem.

For additional information regarding this process, contact Larry Sibik or Matt Stokes, Pinnacle's Process Engineering Division—1-800-366-3406 or 763-315-4501.