

Case History

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Protecting Plastic Media with Fiberglass Grating

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Problem

To comply with Clean Water Act requirements, the Bissell Point Treatment Plant in St. Louis, Missouri, built a new trickling filter system that accompanied a subsequent activated sludge treatment phase. The plant uses six trickling filter towers, each measuring 40-feet tall by 135 feet in diameter and capable of treating 50 million gallons per day (mgd), though the typical operating capacity for each filter is approximately 25 mgd. The six towers hold 2.7 million cubic feet of plastic media—originally installed at a cost of \$4.5 million—for housing bacteria that treat wastewater.

However, about six months after the plant was up and running, engineering personnel noticed erosion on the plastic media's top layers; extra-heavy loading was believed responsible. The surface area of plastic media atop each trickling tower

is 14,313 square feet, and the total load each hour from the wastewater is 8.33 million pounds. The wastewater is distributed fairly evenly throughout the surface area by four rotating sprinkler arms (each with 25 holes) equipped with splash plates that direct the wastewater onto the plastic media. Assuming that each square foot of surface area is subjected to the same hydraulic load (though it is more likely that some areas

are subjected to more wastewater than others), about 581 pounds per hour of wastewater falls on each square foot of plastic media surface area.

Solution

Ultimately, the plant was forced to replace approximately 170,000 cubic feet of plastic media along the top 2-foot layer of each filter. But a solution was needed to prevent erosion from destroying the plastic media again. This time, the company's investment was protected by installing a 1-inch thick layer of fiberglass grating between the sprinkler distributor arms (which feed water into the towers) and the plastic media. Fiberglass grating was used because engineers noticed that plastic media located under fiberglass walkways atop the towers remained erosion-free. The plant installed approximately 84,000 square feet of fiberglass grating from the Chemgrate Corporation (Woodinville, Washington) to act as a protective blanket over the plastic media.

Chemgrate's material is composed of 65 percent resin and 35 percent continuous fiberglass strand, which provides excellent corrosion and erosion resistance. This fiberglass grating was specifically designed to provide safe, long-lasting flooring in environments where chemicals and other corrosive materials attack and destroy metal grating. In addition, it resists rot, fungi, bacterial growth and adverse effects of acids and alkalis.

Results

To date, the plastic media and the fiberglass grating are holding up well, with no deterioration evident.

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Figure 1

