

## CASE STUDY

**Rotoshear®**  
City of Milwaukee, WI



# Rotoshear® units screen flush water in CSS deep tunnel system

## Overview

Dozens of major U. S. cities with combined sewer systems are grappling with sewer overflow problems. Combined sewer systems (CSS) were originally installed to accept normal domestic sanitary wastewater flows along with stormwater runoff.

Most of these systems were designed long ago and are being taxed by the growing demands placed on them. Increased domestic and industrial discharge and stormwater and snow runoff from new streets, parking lots and cleared area have all combined to overload this outdated infrastructure. The result is overflows of water, debris and sewage polluting rivers and lakes.

The Clean water Act of 1972 set regulations for discharge into lakes and streams. Combined Sewer Systems were deemed point sources of pollution and were in violation of municipalities' NPDES permits.

Effective in April, 1994, a new EPA ruling, the National Combined Sewer Overflows (CSO) policy, set control standards for CSS systems.

## Challenge

In 1972, neighboring states filed a lawsuit in Federal court charging the City of Milwaukee with discharging inadequately treated wastewater into Lake Michigan.

In 1976, the sewage commission of the City and County of Milwaukee and the Wisconsin Department of Natural Resources challenged one another in Circuit court over the NPDES limits set by the State of Wisconsin.

After an evaluation of the treatment capability and projected flows, the Milwaukee Metropolitan Sewage District (MMSD) determined that a severe storm could create as much as 500 million gallons of wastewater. The District's two wastewater treatment plants combined could only treat 400 MGD.

Based on this information, the MMSD decided to meet the maximum requirements assuming that these requirements would eventually become the enforced standard. In his open containers without spilling onto the highway. Hauling costs were high since the loads were heavy with water.

## Solution

A \$2.3 billion, 18-year public works pollution abatement plan was designed by CH2M Hill and a consortium of five consulting engineering firms. The plan consisted of: 1) a deep tunnel system that would store excess wastewater until it could be treated at the wastewater treatment plant; 2) major upgrades to the existing sewer system; and 3) expansion of the two major wastewater treatment plants serving the city.

The tunnels, capable of holding up to 400 million gallons of wastewater, were first used in the summer of 1993. The tunnels collected 7.5 million gallons of sewage and stormwater overflow from a two-hour storm.

The wastewater contained rocks, branches, plastics, rags, silt and anything that could be carried along with the rushing water. The solids were settled out of the wastewater in the tunnel and the liquid flow pumped to the wastewater treatment plants. The tunnels are then flushed clean of debris.

The flush water and debris were channeled to a 5 million gallon, above ground storage tank at the Jones Island WWTP. Two Rotoshear® internally fed, rotating drum screens separated the solids from the flush water. This was done to prevent clogging of downstream equipment and heavy solids loading at the headworks.

The Rotoshear® Model HRS 6072 wedgewire screens with .250" openings were selected because of their ability to handle the large gross solids as well as the slurry-like sedimentation. The screens work automatically without operator attention and are equipped with spray bars to keep the screen surfaces clean. The screened solids were dewatered before being sent to landfill. Wastewater from the screens was sent to the headworks of the WWTP for further treatment.

## Result

The City of Milwaukee created a model for advanced pollution control. Their proactive planning improved the water quality of local rivers, streams and Lake Michigan. ■



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