

# Innovative Sludge Drying Bed Design

CASE STUDY



## *The Problem:*

Dewatering sludge at wastewater treatment plants has traditionally been a major operational concern. Most large operations must use mechanical filter presses or centrifuges to efficiently dewater their sludge. For many smaller operations, however, this equipment is too expensive and too large for their needs. Therefore, many smaller facilities rely on the sand filter drying beds for sludge dewatering. Removing dried sludge from sand filter drying beds can be a problem because small tractors or loaders cannot be operated on the loose sands of a conventional drying bed. Because of this, the methods used in the past for cleaning the beds have included hand labor and various forms of mechanical devices which are not directly supported by the sand structure.

In Florida, the Sarasota County - Solid Waste Operations Division (SC-SWO) had a problem with their mixed-media, vacuum sludge-drying beds which are used to dewater chemically oxidized septage sludge. The material used for the fixed media would deteriorate under constant use and replacement was very expensive. The SC-SWO preferred to continue its practice of running a small tractor onto the drying bed to remove the sludge, keeping labor, and time for cleaning and sludge removal to a minimum. However, a solution had to be found that would allow the SC-SWO to operate their small tractor on top of the sand filter bed and use a front load bucket to remove the sludge.

## *The Solution:*

**Presto GEOWEB®  
Cellular Confinement System**

Presto's Geoweb cellular confinement system was identified as a potential solution since it had been specifically developed to support vehicular traffic over poor soil conditions. The Geoweb system allows for complete structural support by preventing lateral slippage or shear of the confined material.

### **Project:**

Sludge Drying Beds

### **Owner:**

Solid Waste Operations Division  
Sarasota County, FL (SC-SWO)

### **Presto Distributer:**

RH Moore & Associates

### **Location:**

Sarasota County, FL (SC-SWO)

### **Time frame:**

September 1991



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# Presto Geoweb® Cellular Confinement System

## Features/Benefits of the Geoweb system:

In September, 1989, the Geoweb cellular confinement system was installed in a filter drying bed in the top sand layer. A cross section view of the installation consisted of a 2-in. sand layer surcharged over the 8-in. sand-filled cellular confinement system. This functions very well because cleaning of the sand drying bed requires the removal of only the top inch or two of sand with the sludge. The Geoweb system also acts as a natural depth gauge for the end loader.

Through experimental work done at SC-SW0, ordinary DOT specification filtration sand proved just as effective as the more costly and much finer filtration material supplied for filter beds. However, unless the Geoweb cellular confinement system is used, the DOT filter sand will not support an end loader on top of the filter bed for neither construction nor sludge removal and maintenance operations. The cost of this system was \$6,000 for the 1,700-sq ft bed.

Since installing the Geoweb system, cleanup operations have been extensively improved, even beyond that of the original fixed-media filter bed.

This new system allows the SC-SW0 to load and clean a 1,700-sq ft drying bed in 48 hours under normal conditions rather than the several days required for the original system. The sludge removal operation occurs on an average of every three days. Use of DOT specification sand versus the original fixed-media system reduced the cost of replacing the filtration medium from \$208,000 to less than \$12,000 for two 1,700-sq ft beds. The per square-foot cost was reduced from \$61.00 per sq ft to \$3.53 per sq ft. Through this system, SC-SW0 has reduced its total maintenance costs by more than 50 percent.

1. Directly supports end loaders allowing them to drive directly on the sludge drying bed without destroying the integrity of the filtration media.
2. Prevents lateral slippage or shear of the filtration sand.
3. Reduction in filtration media replacement costs. One to two inches of sand are sacrificed in the sludge removal process.
4. Loading and cleaning time is significantly reduced.
5. Uses economical DOT specification sand for rapid dewatering versus expensive, conventional drying bed materials.
6. Square foot installation cost reduced by 94% over fixed media system.
7. Total maintenance costs reduced by more than 50 percent.



1. The 8 ft x 20 ft x 8 in Geoweb sections were extended, staked and filled with DOT specification filtration sand.



2. An end loader places filtration sand in the Geoweb cells.



3. The confined filtration sand easily supports the loader used to remove dried sludge.



4. A 1,780 sq. ft. drying bed is loaded and cleaned in less than 48 hours.

Condensed from article by John A. Banks, Jr., PE and William K. Lederman, PE.; Public Works Magazine, September, 1990



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