



The Low Cost, High Volume Dewatering Solution

Geotube® dewatering technology has become the method of choice for organisations around the world. It is used for projects large and small, and there's good reason; simplicity and low cost.

Since Geotube® dewatering technology works without belts or gears, there are less moving parts, less wear, less downtime and less spare parts than in conventional techniques.

Geotube® containers are available in a variety of sizes, depending on your volume and space requirements. Geotube® systems can even be mounted in mobile roll-off containers that can be transported around your property as necessary. It's one of the most versatile dewatering technologies available.

Thereby it is one of the most effective solutions available. Volume reduction can be as much as 90%, with high solid levels that make removal and disposal easy.



Sludge before (left) and after (right) treatment with Geotube® dewatering technology.



1. Filling

Sludge is pumped into the Geotube® container. Environmentally safe polymers are added to the sludge, which make the solids bind together and water separate.



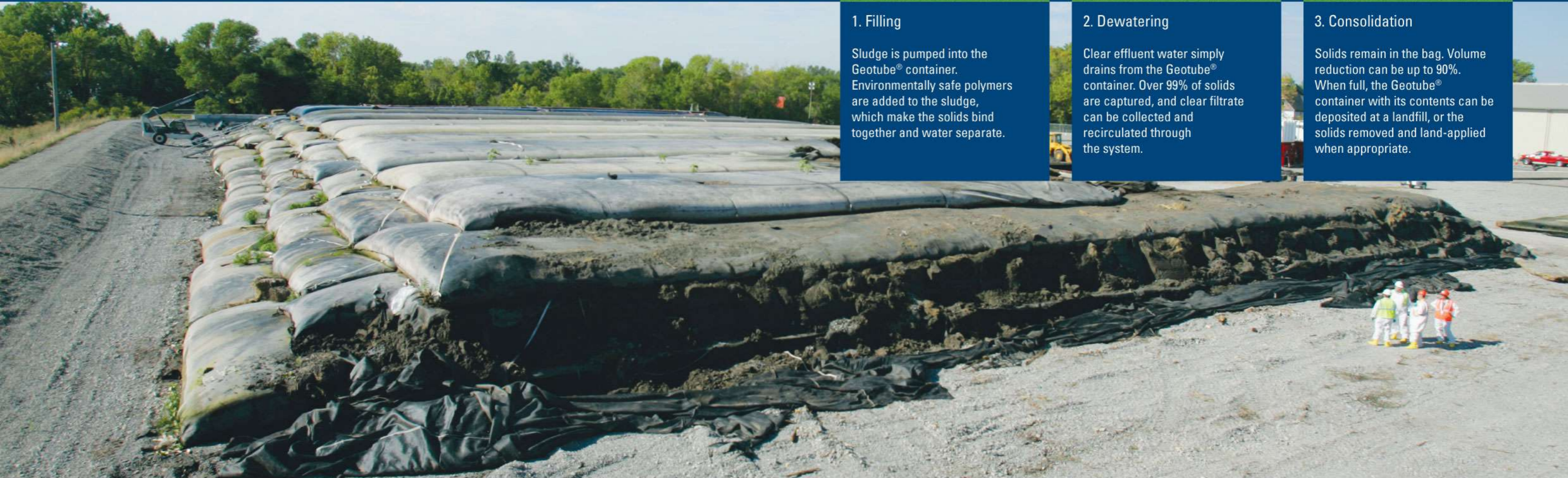
2. Dewatering

Clear effluent water simply drains from the Geotube® container. Over 99% of solids are captured, and clear filtrate can be collected and recirculated through the system.



3. Consolidation

Solids remain in the bag. Volume reduction can be up to 90%. When full, the Geotube® container with its contents can be deposited at a landfill, or the solids removed and land-applied when appropriate.





Case Study

application Remediate contaminated bay, North of Porto Marghera
location Venetian Lagoon, Italy
product Geotube® Dewatering Technology

North of Porto Marghera (one of the most important industrial and commercial ports in Italy), a low lying, tidal inlet area became a site for the dumping of industrial waste. Heavy metals, organic compounds and radioactive substances have been leached from the wastes into the sediments of the Pili inlet and the Venetian lagoon. This area was remediated for development. 80,000 m³ of contaminated sediments from a 50m wide strip around the edge of the Pili inlet was excavated. Aggregates were extracted for reuse. The sediment slurry was dewatered using Geotube® Dewatering Technology. The dewatered solids were disposed of at a nearby landfill while the effluent water was treated before returning to the Venetian lagoon.

Environmental Remediation

Effective Containment for Large and Small-Scale Projects

Rivers, bays, harbours, marinas, ports, and dock facilities have been collecting contaminated sediments from industrial runoff for many years. In many cases, these sediments pose significant environmental hazards, and remediation is a difficult and expensive task.

Marine sediments can be contained and dewatered easily with the Geotube® dewatering technology. This can be accomplished at or very near the site by utilising a dewatering basin where Geotube® containers can be stacked several layers high to minimise the space needed.

Geotube® units can be sized for large-scale or smaller applications, and effectively contain even hazardous materials, reducing their volume dramatically and saving thousands in disposal costs.



Dewatered sludge being removed from a Geotube® container with an excavator

Pulp and Paper

Multiple Uses

Geotube® dewatering technology is used for a variety of applications within pulp and paper mills, including:

- Primary and secondary lagoon cleanout
- Fly ash and alum sludge
- Contaminated sediments
- Continuous systems clarifier, sentrate, process waste stream
- Process rejects
- Separation dykes
- Emergency uses, such as cleanouts, spills, dumps, or exceeding discharge limits.

The rapidity with which a Geotube® dewatering operation can be set up, as well as the low investment involved have also been advantages in paper mill applications, particularly in emergency situations where mills ran the risk of having to shut down.



Geotube® containers in activated sludge basin at paper plant



Case Study

application Cleanout, Kaskinen Lagoon
location Kaskinen, Finland
product Geotube® Dewatering Technology

Oy Metsä-Botnia Ab is Europe's second largest pulp producer, with pulps ideally suited for the production of high-quality papers, packaging boards and tissue.

Botnia's oldest pulp mill, at Kaskinen, had a slurry pond with an area of around 40,000 m², and the construction of a new landfill required this pond to be emptied. The top 1.5 m of slurry was dredged and filled into Geotube® containers.

The work was carried out in two stages: In 2005, around two-thirds of the slurry was dredged into Geotube® containers and left to consolidate and dewater. Processing of this difficult slurry was successfully completed during the summer of 2006. The water discharging from Geotube® containers was monitored, confirming that BOD, COD and heavy-metal reduction was extremely high.





Case Study

application | Dewatering of Acidic Mine Tailings
location | Skytop Mountain, USA
product | Geotube® Dewatering Technology

During the construction of I-99 in Pennsylvania, workers unearthed more than 540,000 m³ of pyritic rock left over from mining. The acid runoff from this material threatened local streams and groundwater. The solution: a process using Geotube® dewatering technology.

The pyritic rock is crushed and treated with a neutralising agent. Acid runoff from this process is collected in sediment ponds, which is treated and pumped through Geotube® containers. Water, clear and neutralised, flows from the Geotube® container without requiring further treatment.

Mining and Mineral Processing

Flexible Enough for Available Space

Mine tailings, coal sludge, and other materials can be managed and handled cost-effectively with Geotube® dewatering technology. Because Geotube® containers can be custom-sized to the application, they can be placed in available space between other structures, and removed once dewatering is complete. Geotube® dewatering technology is a cost-effective alternative to mechanical processes. It reduces disposal cost by consolidating higher solids with very little maintenance.



Coal sludge dewatering using Geotube® dewatering technology

Effluent can be pumped directly from the process; or if a clarifier/thickener is used, effluent from the underflow can be diverted through the Geotube® container, eliminating the requirement for an expensive mechanical dewatering device. Geotube® units can be used to capture fines, silts, and clays from the tailings effluent prior to discharge into the ponds or directly into streams. Geotube® units will separate and dewater the fines and allow disposal without expensive dredging and transporting operations. In some cases, conditioners or polymers are used to promote flocculation to improve solids retention and filtrate quality.

Geotube® containers can also be used to utilise the fines to build dykes and containment berms.

Power Generation

A Solution for Fly Ash and Bottom Ash

Power generation by-products such as fly ash and bottom ash can be a real challenge to remove and manage. But the simple technology of Geotube® dewatering allows facilities large and small to easily consolidate these materials. Because of the low investment involved you can always adapt the volume according to your actual needs.

Geotube® dewatering technology safely contains fly ash, preventing airborne particle contamination from windblown ash piles. The ash can then be used for road base applications or even to build up the berms around a lagoon to increase its capacity. In many fly ash operations, there is no need to add polymer to the dewatering process, making it simple and even more cost-effective.



Geotube® containers at fossil fuel power plant being used to dewater fly ash.

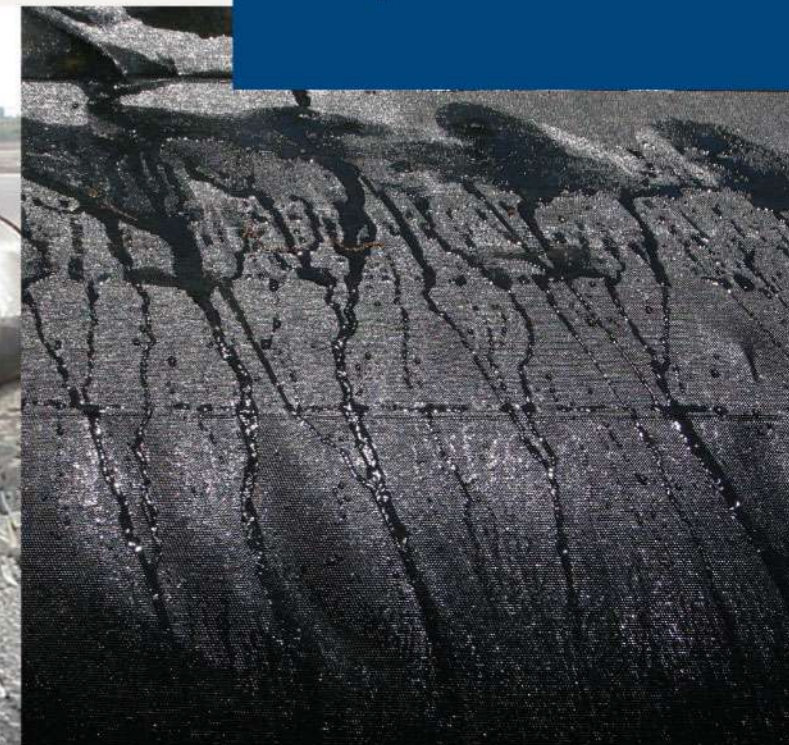


Case Study

application | Dewatering of Boiler Ash
location | Camden, USA
product | Geotube® Dewatering Technology

Geotube® dewatering technology was used for dewatering a lagoon containing approximately 3.8 million liters of boiler ash, with solids 2.6% by dry weight. Previous dewatering attempts using a long stick Trac Hoe were only partially successful, and the sludge had been laid up on the bank of the lagoon to dry; not an ideal approach.

However, by using Geotube® dewatering technology, the facility was able to remove and dewater practically all the solids in the lagoon. After 30 days, the material had consolidated to 37% solids. It is estimated that this approach saved the power plant more than \$60,000 annually.





Case Study

application Dewatering of Sewage Sludge,
Lithgow Treatment Plant
location New South Wales, Australia
product Geotube® Dewatering Technology

Geotube® dewatering technology was used to contain and dewater about 4,000 m³ of sewage sludge from Lithgow City Council's Sewage Treatment Plant sludge lagoon. The lagoon bottom sludge has been consolidated for many years and required a cutter suction type dredger to excavate and pump sludge to the Geotube® unit.

Solids were pumped at about 4% content by weight. When the Geotube® unit reached the design height limit, pumping was switched to an adjacent Geotube® unit while the filled Geotube® unit was left to dewater. The Geotube® units were refilled and dewatered until the contained solid contents reached about 15%. The Geotube® units were then left to consolidate to about 30% before the unit was cut opened and the dewatered sludge excavated for disposal.

Water and Wastewater Treatment For Applications Large and Small

A common problem at small Sewage Treatment Works, where sludge is dried on drying beds, is that the limited capacity of the beds can easily be exceeded. This could be due, for example, to an increase in sludge quantity resulting from an increasing population.

The Geotube® system is increasingly being used as a means of both simplifying the sludge dewatering process and effectively increasing the volume of the drying beds. Whereas in the past the drying beds had to be emptied at regular intervals, the time for a complete fill of the Geotube® unit can be increased to several months. A significant saving can therefore be made in terms of handling and transportation.



Geotube® unit in municipal wastewater treatment drying beds.

After the sludge has been treated with a flocculant it is pumped into the Geotube® unit where the sediments remain and the water seeps through the pores of the tube. This process can be repeated over and over again until the Geotube® unit reaches its maximum level.

Larger Wastewater Treatment plants can also utilise the Geotube® system for sludge containment and dewatering as an alternative to belt-presses and/or centrifuges. It can also be used as an emergency kit if the available dewatering units are out of order.

Light Industrial Managing an Ongoing Challenge

For many industrial applications, dewatering is a necessary evil. It disrupts operations, adds cost, and requires complicated and expensive equipment. But this doesn't have to be the case. One of the real values of Geotube® dewatering technology is that it can provide a quick lagoon cleanout solution, or it can add capacity by making drying beds much more efficient.

In some cases, companies have dewatered the material in their lagoons using Geotube® dewatering technology, then used the solid-filled Geotube® containers as berms. Since they can be stacked on top of each other, you can use them to further add capacity to the lagoons. With Geotube® containers you can improve the dewatering efficiency. Dewatered solids are protected from becoming saturated again in wet weather.



Water draining from a Geotube® container.

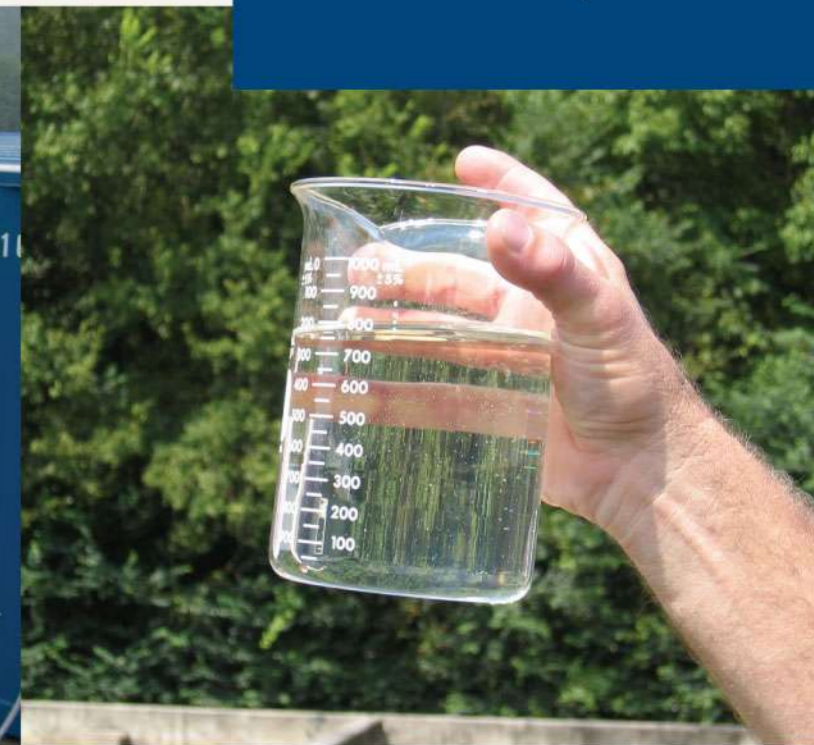


Case Study

application Dewatering Adhesive Production Residuals
location Panama City, FL
product Geotube® Dewatering Technology

The residual material left over from Arizona Chemical's adhesive production process contains inorganic compounds and is too abrasive to dewater with a belt press. Geotube® dewatering technology proved a more effective solution.

The dewatered cake solids from Geotube® dewatering technology far exceeded any other form of dewatering previously utilized. This increase in efficiency saved 38% over belt press dewatering—plus a 50% reduction in time to complete the job. Because the dewatering efficiency was so much greater and the cake solids drier, there was a 40% reduction in disposal costs.





Case Study

application | Dewatering of Palm Oil Mill Effluent Sludge
location | Selangor, Malaysia
product | Geotube® Dewatering Technology

Palm oil mill effluent (POME) generally has high organic content and needs to have the biological oxygen demand (BOD) reduced in lagoons over time, prior to discharge to the environment. Sludge accumulated needs to be removed from these lagoons from time to time.

The conventional approach adopted by mill operators is to dewater the sludge using mobile filter presses or mobile decanter units which generally involve high capital expenditure and maintenance costs. Geotube® dewatering technology was chosen in this facility in Selangor, Malaysia as the dewatering option as it was more economical than the conventional solution.

Agriculture

For animal wastes and agricultural process sludges

Geotube® dewatering technology is an effective way for managing waste from animal feeding operations. It works for lagoon cleanout and closure, and manages nutrients very effectively (over 90% phosphorous and heavy metal removal; 50% or greater nitrogen reduction). It also controls odour and produces irrigation quality effluent water.

In a country with severe rules and legislations as the USA, Geotube® dewatering technology is designated as a Practice Standard.

Many economies in Asia are dependent on agriculture. Large scale plantations like palm oil, etc. have on-site integrated processing facilities which generate significant quantities of effluent wastes that are digested in lagoons. Geotube® Dewatering Technology are ideal for cleaning out sludge lagoons and dewatering. The dewatered biosolids can be composted for use as fertilisers in the plantations.



Geotube® dewatering technology used inline keeps your operation running.

Aquaculture

Simple, Cost-Effective Waste Removal for Applications Large and Small all over the world

Geotube® technology is used all over the planet. In the USA it has even been approved as a Best Management Practice for Aquaculture by the State of North Carolina, Geotube® dewatering technology works for fresh water or marine finfish, shrimp, and other aquatic species. It simplifies the process for water recirculation, and retains more than 99% of suspended solids.

Geotube® dewatering technology reduces nutrient loading in filtrate. It can be used continuously or intermittently year-round in most climates. It is ideal for lagoon, retention pond, and filter waste applications. It can be used for cage waste removal, benthic table waste cleanup, recirculation waste removal for hatcheries, and processing plant waste dewatering. Dewatered solids can be land applied or disposed of in a landfill.



Aquaculture benthic deposit water before and after Geotube® treatment.

Geotube® dewatering technology is a proven technology. It offers secure solutions that have been tested by many institutions world wide. More importantly, Geotube® dewatering technology has been used in the field with solid success in many countries around the globe.



Test Your Material

A simple bench-scale test can determine if Geotube® dewatering technology is right for your application.

Our Geotube® Dewatering Test (GDT) uses an actual sample of the material you need dewatered. The results from this test have been proven to be an accurate indicator of how Geotube® dewatering technology will work in full-scale operation. You can effectively estimate effluent quality, solids, and dewatering rates.

See your Geotube® representative to schedule a test for your material.

See Our Presentation

To learn more about this technology, we invite you to look at our CD presentation, which provides detailed information. We can even schedule "lunch and learn" sessions for larger groups.



TenCate develops and produces quality products that increase performance, reduce cost, and deliver measurable results by working with our customers to provide advanced solutions.

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