

TITANIUM DIOXIDE PLANT, TERENGGANU

GEOTUBE® dewatering and containment of gypsum wastes



Industry:	Mining
Application:	Waste management
Location:	Malaysia
Product:	GEOTUBE®

Overview

Industrial waste, often in slurry form and containing contaminants, needs to be managed and disposed of properly to protect the environment. This case study focuses on the dewatering of gypsum waste slurry at a titanium pigment plant in Malaysia using geotextile tubes. The plant produces titanium pigments through a process that involves treating ilmenite with sulfuric acid, resulting in the discharge of red gypsum waste in slurry form with a solid concentration of approximately 16%. Initially, the waste was treated using filter presses (Figure 1).

Challenge

The plant faced capacity and storage issues as the filter presses were operating at maximum capacity, and the sludge lagoons were full. The high cost of adding more filter presses and the low return on investment led the plant to seek more affordable dewatering alternatives.

Solution

To address the problem, the client explored the option of installing **GEOTUBE®** dewatering units suggested by specialist engineers from Solmax as part of an integrated plant processing solution.

A Rapid Dewatering Test (RDT) or Jar Test was conducted to determine the appropriate polymer type and dosage needed to flocculate the sludge. The results confirmed the correct dosage and the effectiveness of **GEOTUBE®** GT500D fabrics in containing and dewatering the red gypsum slurry. The discharge produced visually clear and high-quality effluent. The results were further validated through a **GEOTUBE®** Dewatering Test or Pillow Bag test. Additionally, a full-scale pilot tube was utilized, employing **GEOTUBE®** GT500D fabric with dimensions of 8.8 m (29 ft) circumference and 27.5 m (90 ft) length. This pilot confirmed a 39% dewatered solids concentration and identified operational implications and actual solid volumes within the tube.

A GEOTUBE® solution was successfully implemented at a titanium dioxide plant in Malaysia to dewater gypsum waste slurry. This approach resolved capacity and storage challenges, while improving dewatering efficiency and reducing processing costs.

CASE STUDY

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Figure 1

Over the course of a year, more than 100 units of **GEOTUBE®** dewatering tubes, with dimensions of 36.6 m (120 ft) 1 circumference and lengths ranging from 57 m (187 ft) to 43.8 m (143 ft), were installed as part of an integrated plant waste capture program. These tubes captured a total of 180,000 m³ (235,710 yd³) of dry solids. The use of **GEOTUBE®** dewatering tubes resulted in cost savings in terms of capital expenditure and reduced overall maintenance and operational costs.

Before deployment, the positions of the **GEOTUBE®** units were marked on the geomembrane liner. Each unit, weighing approximately 1.3 tons (2,866 pounds), was lifted and positioned using a mobile crane. The units were then manually unrolled and unfolded by operators or with the assistance of a mechanical winch attached to a 4WD vehicle. A 100 mm

(3.9 in) diameter flexible hose was used to connect the slurry main pipe to the **GEOTUBE®** dewatering units. The filling ports of each unit were connected with flexible hoses, and the slurry inflow for each port was regulated by a gate valve installed between the main slurry pipe and the flexible hose.

Result

GEOTUBE® dewatering technology increased the plant's dewatering capacity by approximately 25%, allowing it to meet the sudden surge in demand for titanium dioxide. Furthermore, the plant was able to conduct a complete maintenance overhaul of its aging mechanical dewatering equipment without disrupting production.



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Bowman
Construction
Supply Inc.



Quick
Supply Co.



Cascade
GEOSYNTHETICS

LOCATIONS & CONTACT INFO

ASP ENTERPRISES

aspent.com
salesasp@aspent.com

BOWMAN CONSTRUCTION SUPPLY

bowmanconstructionsupply.com
salesbcs@bowmanconstructionsupply.com

QUICK SUPPLY CO.

quicksupplyco.com
salesquick@quicksupplyco.com

CASCADE GEOSYNTHETICS

cascadegeos.com
salescascade@cascadegeos.com

St. Louis, MO 636.343.4357
Omaha, NE 402.861.8579
Kansas City, MO 816.554.1191
Wichita, KS 316.393.1554

Denver, CO 303.696.8960
Colorado Springs, CO 719.257.7840
Loveland, CO 970.535.0863

Des Moines, IA
515.289.1271

Portland, OR
971.339.1020

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SEDIMENT CONTROL

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Ditch Checks

- Triangle Silt Dike
- GeoRidge

Perimeter Protection

- High and Low-Porosity Silt Fence, Straw Wattles, Silt Socks
- Safety Fence

Flocculants & Water Treatment

- Polymer-Based & Natural Flocculants

Sediment Basin Skimmers

Dewatering Bags

Trackout Control

- FODS
- Rumble Grates

Turbidity Curtains

EROSION CONTROL

Basic Hydraulically Applied Mulches

- Wood
- Paper
- Blends
- Straw

High-Performance Hydraulically

Applied Products

- BFM
- FGM
- Additives & Tackifiers

Temporary Erosion Control Blankets

- Coir & Jute Mat/Nettings
- Short-Term ECBs
- Extended-Term ECBs

Permanent Erosion Control Blankets

- Turf Reinforcement Mats
- HP-TRMs
- Anchor Reinforced Vegetation System

Structural BMPs

- Transition Mats
- Geoweb Cellular Confinement
- Composite Vegetated Armor System
- Flex MSE Vegetated Wall System
- Articulated Concrete Block
- Gabions
- Grout-Filled Geotextile Mats

Vegetation Establishment

- Native Seed & Turf Seed
- Fertilizers
- Organic Soil Additives
- Stratavault Soil Cells

STORMWATER MANAGEMENT

Water Quality

- Inlet Filter Boxes
- Pre-Treatment Chamber
- Nutrient Separating Baffle Boxes
- High-Flow Biofiltration Media
- Hydrodynamic Separators
- Stratavault

Water Quantity

- Modular Underground Storage Systems
- Chamber Detention Systems

Drainage

- HDPE Swale Liner
- Pipe & Fittings
- Drainage Composites
- Strip Drain

Inlet Structures

- PVC
- Drain Basins, In-Line Drains
- Landscape

Permeable Pavers

- Permeable Articulating Concrete Block
- Grass Pavers
- Gravel Pavers
- Concrete Pavers

SPECIALTY

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