TENCATE Geotube®

Case Study

application	Lagoon Dewatering	job owner	Breakwater Resources Ltd.
location	El Mochito, Honduras	operator	American Pacific Honduras S.A. de C.V.
product	Geotube® Dewatering Technology	designer	Tetra Tech, Golden ,CO

THE COMPANY

TenCate ™ develops and produces materials that function to increase performance, reduce costs, and deliver measurable results by working with our customers to provide advanced solutions.

THE CHALLENGE

The El Mochito mine has a tailings lagoon with a rock filled dam that contains large volumes of contaminated mine tailings slurry. Above the tailings lagoon is a large unstable area, know as the Guard Shack Slide, and has the potential during a heavy rainfall event to develop into an active landslide and release a large volume of soil, rock and debris (400,000 m3) into the tailings lagoon. This large volume of landslide debris could displace the contaminated tailings over the dam into the environmentally sensitive area below the dam or cause a catastrophic failure. Therefore, scenarios must be developed to mitigate against possible slide mass failure into the tailings lagoon.

THE SOLUTION

Dewatering with Geotube® technology is a three-step process. In the confinement stage, the Geotube® container is filled with dredged waste materials. The Geotube® container's unique fabric confines the fine grains of the material.

In the dewatering phase, excess water simply drains from the Geotube® container. The decanted water is often of a quality that can be reused or returned for processing or to native waterways without additional treatment.

In the final phase, consolidation, the solids continue to densify due to desiccation as residual water vapor escapes through the fabric.

Several mitigation scenarios were analyzed, but the design recommended was to construct two Geotube® dam structures in the 10 meter deep, HDPE lined raceway above the tailings lagoon. The two Geotube® Dams would be 2 - 1 and 3 - 2 - 1 pyramid structures of 10 m, 12 m, and 14 m circumference GT1000M Geotube® units. The Geotube® dams had to have the mass and integrity to resist the land slide debris. The lower Geotube® structure when installed would weigh 1,500 metric tons and the upper Geotube® structure would weigh 3,000 metric tons when filled with locally available granular mine tailings.

THE CONSTRUCTION

Before installation of the Geotube® dam structure, strips of high friction angle textured HDPE liner were welded to the existing HDPE raceway liner to provide a higher friction angle between the liner and the Geotube® container surface at the location of the structures. Next, because of the requirement not to retain any water behind each dam and to only retain the landslide debris, it was necessary to install 4 - 0.6m cir. HDPE corrugated drainage pipe bedded in gravel at the base of the structure to drain any accumulation of water through the bottom of the structures. In addition, this helped to level the base on which the Geotube® dam structures were to be installed. First, the drainage pipe was laid in place and bedded in gravel.

Upper Geotube® dam structure

Protective & Outdoor Fabrics
Aerospace Composites
Armour Composites
Geosynthetics
Industrial Fabrics
Synthetic Grass

TENCATE™ materials that make a difference

TENCATE Geotube®

Next, the bottom layer of GT1000M Geotube® units were placed and filled multiple times with a mixture of course and fine mine tailings until the top of the dewatered Geotube® unit reached 2.0 meters. Because of the compound angles of the bottom and sides slopes of the HDPE lined raceway, the filling and dewatering process had to be carefully controlled and monitored to prevent the Geotube® units from rolling or sliding off of the base and down the raceway into the tailings lagoon during installation. After the installation of the bottom layer, 0.3 m ID HDPE corrugated pipe were placed and the next layer of Geotube® units were installed.

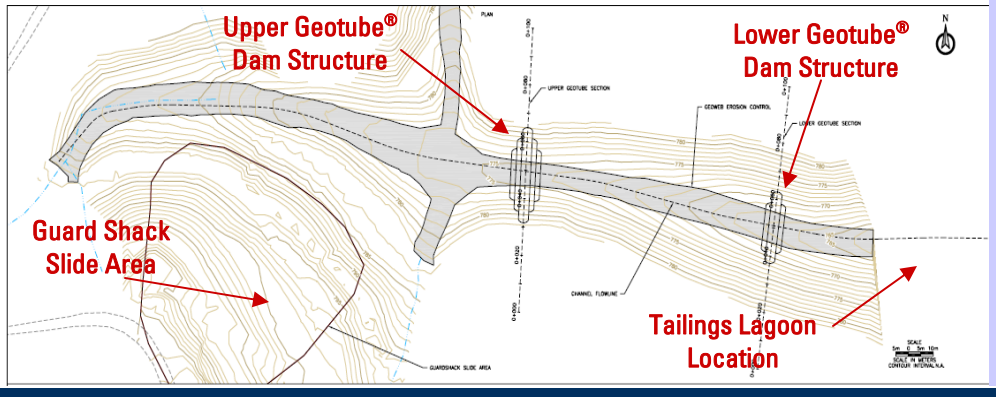
Installation & bedding of HDPE drainage pipe at base

Above: Filling the first Geotube® unit
Below: Lower Geotube® dam structure

THE PERFORMANCE

The use of Geotube® technology to act as the debris dams structures allow the liners to remain in place, the cost to be lower because of the use of tailings as the Geotube® fill material, and the installation time to be shorter. To date there has not been any major movement of the land slide. However, the Geotube® dam structure has controlled high volumes of rain water and debris that has been dislodged.

Drainage raceways leading into tailings lagoon



How Geotube® Dewatering Technology Works

Dewatering with Geotube® technology is a three-step process.

In the ***filling*** stage, the Geotube® container is filled with dredged waste materials. The Geotube® container's unique fabric confines the fine grains of the material.

In the ***dewatering*** stage, excess water simply drains from the Geotube® container. The decanted water is often of a quality that can be reused or returned for processing or to native waterways without additional treatment.

In the final stage, ***consolidation***, the solids continue to densify due to desiccation as residual water vapor escapes through the fabric. Volume reduction can be as high as 90 percent.

Step 1: Filling

Step 2: Dewatering

Step 3: Consolidation

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