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Consolidation of sludge lagoons

Sludge lagoons, Truro and Carling

Client: South West Water Authority Truro CDF, Société Chimique des Charbonnages, Carling
Consultant: City of Truro / CDF Chimie S.A. **Contractors:** City of Truro / Müller Frères
Construction period: 1983, 1984

Geotextile solution to consolidating sludge lagoons

Local authorities and/or companies often have a major problem in finding an effective means of disposing of industrial waste materials in the form of liquids of chemical material. Often such materials are mixed with soft clay to give a consistency of soft sludge.

Typical examples are a water treatment work in the United Kingdom and a waste disposal lagoon for a large chemical factory in the north east of France. For many years, these companies/ authorities have pumped their leftover sludges into lagoons with depths between 5 and 6 m. The sludge material dries out only after a very long period of time.

The idea in each example was to cover the lagoon with sand/gravel to speed up consolidation once the lagoons had reached their highest levels. However, the very nature of this 'heavy water' which would not permit even walking on, meant that such 'capping' material would have sunk almost immediately.

In 1983, the Dutch company, Akzo, proposed a method of construction which enabled each client to dump sandfill material on top of a double layer of heavy-duty reinforcing polyester fabric by small bulldozers. After an initial layer of 0.50-1.00 m fill over the total area of the lagoons had been placed on top of the fabric, it was clearly seen that no mud waves had developed and the top fill material was covered with a 3.00 m layer of fill.
Some three years after the project was completed, it has been established that the fill uniformly settled down into the sludge material and speeded up the consolidation process.

Once installed, the fabric was strong enough to give support to 4 t bulldozer laying fingers of fill material during the initial fill process.

In such projects, the lagoon sides are first prepared for installing the fabric. The surface shape was created rectangular by dumping fill into the sludge and slopes were created 1:1. As fas as possible, the sludge surface was cleared of roots, bushes , glass and metal. Stabilenka fabric type 200/45 on 5.00 m wide rolls were sewn together to maximum sheets of 140 × 120 m. The fabric sheets were folded in a consortina fashion at the edges of the lagoon and then pulled across the surface of the lagoon with ropes.

After the fabric had been installed, a 'sludge lock' was created to prevent sludge from squeezing out during initial fill placement.

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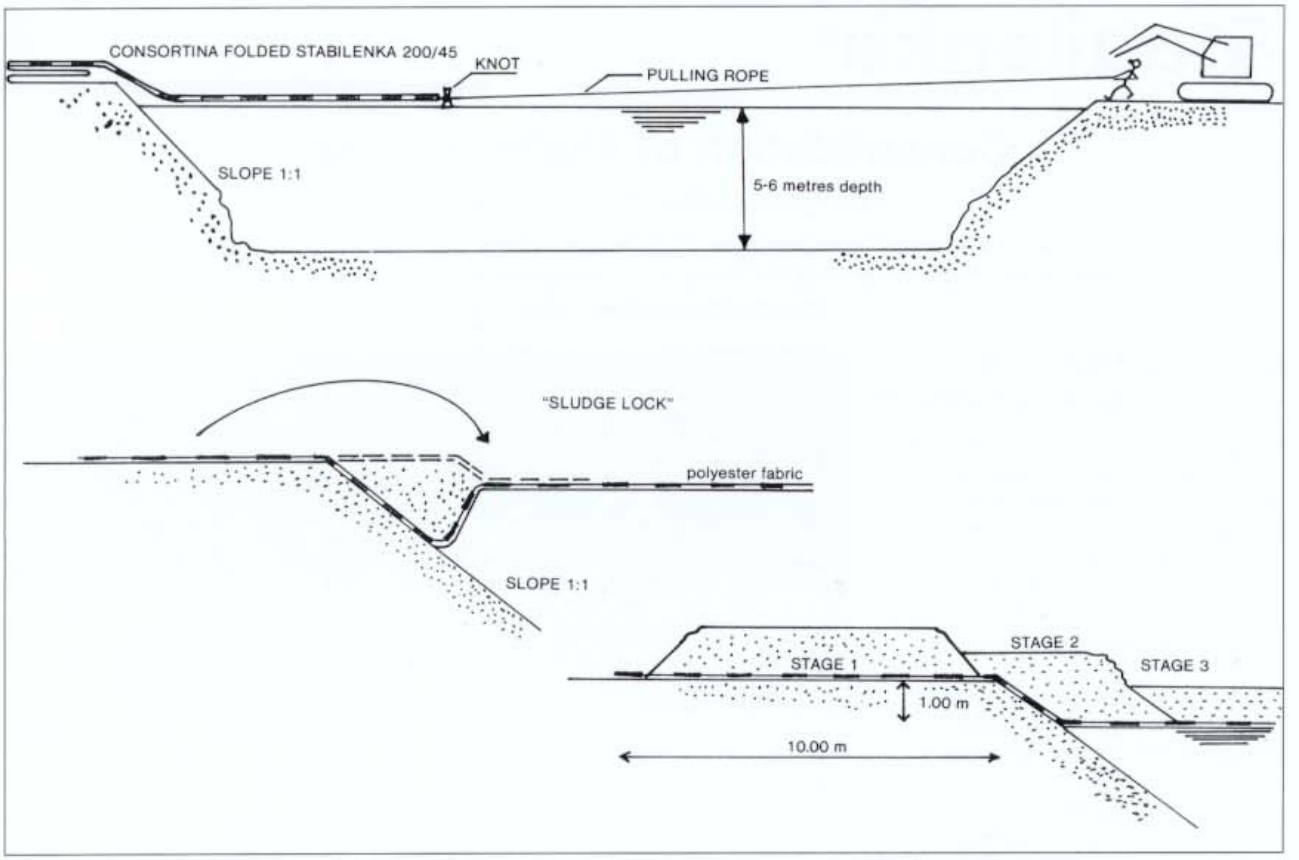

The installing of the Stabilenka 200/45 fabric over the lagoons and anchoring into position.

The two fabric layers were laid in opposing directions to guarantee enough strength in all directions. An overlap of 5 to 10 m at the borders was necessary to enable the fabric to be folded back after the erection of a sludge lock or as an anchoring length.

Once the fabric had been installed, small 4 t bulldozers started to push forward small fingers of fill material to a maximum depth of 1 m. These extended out towards the middle of the lagoon.

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