Carbofol® Combigrid® Secutex® - Closure of Gyöngyös mine - Hungary

Closure of a gold mine

- **Project Name**
  Closure of Gyöngyös mine, Hungary
- **Product**
  Carbofol® HDPE 406 2,5 mm s/s
  Combigrid® 60/60 Q6 R 156 C
  Secutex® R 804

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Challenge

Whatever occurs during the active phase of a mine's life, the need for an environmentally responsible closure is always present. Mining activities can involve contamination of soils and/or groundwater, mean-ing environmental threats might remain after the operation phase. This also applied in the case of the Gyöngyös mine.

Gyöngyös ore mine mainly mined lead and zinc, but also gold. Opened in the 1950s, it was the largest ore mine in Hungary until 1985, with an annual output of 100 000 - 200 000 tonnes. The mine was closed in 1986, and production has been suspended.

The technology used at the time discharged the flotation tailings into the Száraz Valley mud basin. This leachate contained heavy metals released into the nearby Toka stream and polluted the environment, posing a serious threat to the local communities and wildlife.

In 2006, the mine started its final closure, remediation and recultivation, which was completed in 2016.

Solution

One of the most effective ways to improve the long-term environmental safety of the site is to isolate what had been the mining zones by installing a geosynthetic sealing system. This was also applied in this case.

According to the recultivation plan for the mine closure, all the tailings and contaminated sediments from other sites were disposed of in the Száraz Valley tailings pond, lined with Carbofol® geomembrane and protected with Secutex® geotextile.

Carbofol® geomembranes were chosen because they provide an efficient seal against the most toxic substances. Moreover, they have high durability due to the excellent stress crack resistance. In addition, their embossed surface structure is responsible for safe slope construction. Finally, protection strips on the welding area, lateral overlap marking and meter scaling ensure a fast, easy and safe installation.

In addition, a solution also had to be found for another challenge: Removing the vegetation on site and making the soft mud surface accessible was a significant problem. The area to be reclaimed was then stabilised and reinforced with a layer of Combigrid® (combination of geogrid and geotextile) laid directly on the surface of the mud.

Combigrid® fulfils four functions (separation, filtration, stabilisation and reinforcement) in one product and was the perfect solution to this challenge. The geogrid provides high strength at low elongation, which is key to efficiently reduce subgrade deformations caused by stresses applied to the surface. The geotextile in addition acts as a separation layer and ensures long-term filter stability.

Accompanying measures complemented the reclamation plan, e. g. to maintain the stability of the mud reservoir, drainage channels were installed to drain the slurry body and reduce pore water pressure. Finally, this was followed by planting and landscaping. On top, a monitor-ing system consisting of water monitoring wells has been constructed around the site and is operated continuously.

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