References

Drainage systems around Żelazny Most tailings pond, KGHM



Uponor involvement

- WehoPipe pipes DN 110-1200 over 32 km, Weholite DN 500-1200 approx. 5 km, WehoDuo approx. 25 km, Weho manholes, seismic and other

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For almost 20 years, Uponor Infra has assisted the Polish mining conglomerate KGHM Polska Miedź S.A. in modernising Europe's largest tailings pond.

The Żelazny Most (Iron Bridge) tailings pond stretches over a 1,400-hectare area and is surrounded by a 14-kilometre dam. It is the sole deposition site for flotation tailings from the mines and ore enrichment facilities of KGHM Polska Miedź S.A., one of Poland's largest companies, whose mining and smelting activity is the backbone of the region's economic development.

Project Facts:

Location	Completion
Poland	2021
Building Type	Product systems
Industrial	Drainage, Tailor made constructions, Industrial pipes
Project Type	
New building	

Partners

Investor:
KGHM Polska Miedź S.A.

For years, KGHM has been among the world's largest producers of copper and silver. In 2012, the company became a global giant after buying a Canadian mining company with ore deposits in Canada, the United States and Chile. In Poland, the company's activities centre around Europe's largest copper ore deposit, with the mining area spanning 470 km2. The company operates three mines (Lubin, Rudna, and Polkowice), three ore enrichment facilities and auxiliary divisions.

Key link in the KGHM production

The Żelazny Most tailings pond is the key link in the production of copper concentrate. Copper ore contains only a small percent of the precious metal. This means that more than 90 percent of the mined rock constitutes waste, which has to be removed in the technological process. Tailings from the flotation process, whereby valuable minerals are separated from the ore, have the form of slurry, which is eventually pumped to the tailings pond. Here, sedimentation takes place – solids are separated from water – and the reclaimed water is returned to the ore enrichment plants. The scale of these processes is enormous: the annual tailings deposits at Żelazny Most are estimated at 20 to 26 million tonnes. In 2012, the total volume of waste was 522 million m^3.

Operating and modernising of such a complex industrial facility is quite challenging. The pond is located in a moderately populated area, and laws aimed at protecting the local environment from the detrimental effects of the mining industry are stringent. KGHM is fully committed to making sure that the operation of Żelazny Most is as safe and problem free as possible. The company invests large amounts of money in day-to-day monitoring, cutting-edge equipment and technologies, as well as scientific research pertaining to the pond's expansion.

Strict procedures involving the application of new technological solutions to the existing infrastructure mean that KGHM's prospective partners must meet the highest standards of service. For almost 20 years, Uponor Infra has supplied KGHM with high-quality polyethylene piping systems that transport water and slurry. In addition, Uponor Infra offers technical assistance at all stages – including design, welding and installation – drawing on its vast expertise in implementing challenging engineering projects.

Modern Uponor Infra solutions

Krzysztof Wrzosek of Hydroprojekt Warszawa, the head designer for Żelazny Most, explains that when the facility was built in the 1970s, the use of polyethylene in industrial applications was still relatively limited. Consequently, the piping system connecting the ore enrichment facilities with the tailings pond was designed and built with traditional and at that time popular materials such as concrete and steel. As long as the system operated without problems, there was no need for change. Only later, when portions of the pipeline began to show the usual wear and tear, there was a need for modernisation.

The division of KGHM responsible for managing water and waste flow from the three ore enrichment facilities and the daily operations of Żelazny Most is Zakład Hydrotechniczny (Tailings Management Division). It acts as Uponor Infra's direct partner and investor for all joint projects. In 1997, Uponor Infra delivered its first drainage piping (WehoDuo, WehoPipe and Weholite) to the tailings pond. The drainage pipes and chambers are located in the dam and its immediate vicinity. Together with ditches running along the dam's perimeter, they intercept approximately 80 per cent of the infiltrating water, playing a vital role in protecting the local water resources. Uponor Infra's products are perfectly suited to the difficult conditions at the facility. The challenges to the pipework include substantial earth loads resulting from periodical extension work on the dam as well as difficult installation conditions. The excellent product properties, such as resistance to damage resulting from differential soil settlement, low weight, flexibility and butt fusion welded monolithic joints allow for exceptional reliability and a long life for the pipeline system.

Maintaing the highest standards

KGHM Polska Miedź S.A. is a company operating on a huge scale, and as such it expects efficiency, innovation and top technological solutions. The projects carried out over the years by Uponor Infra and Zakład Hydrotechniczny confirm the highest quality and versatility of the PE-HD technology. Uponor Infra has proven itself to be a reliable partner, ready to listen and assist in making even the most demanding engineering projects work. Soon the company will face exciting new challenges, as it recently won a tender for new pipeline deliveries to KGHM over the next three years.

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Address

Uponor UK
The Pavilion, Blackmoor Lane,
Watford, WD18 8GA

Phone 01923 381212
E-Mail
customerservice.uk.bfs@georgfischer.com
W www.uponor.com