

Fibre Optic Leakage Detection System Merowe Dam, Sudan

Historical dam failures and incidents show that internal erosion caused by seeping water is a significant threat for the safety of hydraulic structures. Thus, an early detection and an exact localisation of leaks in sealing systems in the field of hydraulic engineering is the most important prerequisite for a pinpointed and inexpensive rehabilitation.



Merowe Dam, Sudan

The Merowe dam is located on the Nile, about 350 km north of Khartoum. With a storage volume of approx. 8.2 billion m³ of water it is Africa's largest contemporary hydropower project. It is used for power generation, irrigation and flood protection. The dam consists of several sections: the main dam is a rockfill dam with a core seal and on both sides of the valley are rock fill dams with a concrete surface (CFRD).

For a reliable and a cost-effective monitoring of the sealing system's functionality, approximately 7000 m of hybrid fibre optic cable was installed below the copper water stop at the upstream dam toe. The monitoring system has a local resolution of 0.25 m and a temperature resolution of 0.2 K. This allows the exact localisation of a possible failure of the copper water stop.

In 2008, zero measurements and a simulation test were carried out in order to check the functionality of the monitoring system. Regular measurements are performed since.