Fibre optic seepage monitoring system Bagatelle Dam, Mauritius

Internal erosion processes caused by seepage pose a major threat to the safety of embankment dams and levees. Early detection and exact location of leaks are therefore the basis for reliable structural monitoring.

Construction of the Bagatelle Dam

With a storage capacity of about 14 Mio m³, the Bagatelle dam is one of the five main water supply projects designed to meet Mauritius water needs and to solve its water problems. The Dam will provide a more reliable water supply for the Port-Louis and Plaines Wilhems regions.

The 2.5 km long and up to 48 m high earth-rock fill dam was equipped with roughly 2200 m of fibre optic cable and a seepage monitoring system was installed. The cable layout is designed to monitor the functionality of the clay core sealing in a reliable and cost-effective way. The fibre optic cable is placed at the downstream side of the clay core at the transition to the dam base within the filter.

With a spatial resolution of 0.5 m and a temperature resolution of 0.2 K the system enables to pinpoint the location of possible leaks through the clay core of the dam.

The zero and heat-pulse measurement before the first impoundment show that this system is fully functional for the gradient and heat-pulse method. The measurements will serve as reference for all following measurements.