

LESOTHO, KATSE DAM

Refurbishment of plumbline and pendulum measurement systems.

THE PROJECT

The Katse Dam, constructed during the first phase of the Lesotho Highlands Water Project, is a 185m high double arch concrete dam with a crest length of 710m. The geological formation of the Katse dam area is characterized by the existence of almost entirely basaltic, nearly sub horizontal, lavas flow deposits. The main discontinuities are composed of sub horizontal shear zones and flow contacts, layers of basalt and some sub vertical stress relief joints.

THE SYSTEM



After main construction work was completed, a set of direct and inverted pendulums, partially equipped with manual operated and partially with automatic pendulum measuring devices not originating from Huggenberger AG, has been installed.

THE OUTCOME

In the year 2017 Huggenberger was awarded to supply new VDD3V4 type telependulum measuring systems in replacement the old equipment. Three of these units have been installed on inverted pendulums and seven units on direct pendulums. All devices for monitoring the direct and inverted pendulums are to measure also vertical displacements relative to the pendulum fixing point. Therefore the wires are equipped with a special cone-shaped component. The technology of the VDD3V4 telependulum readout device allows to detect the vertical position of the cone with an accuracy within 0.05mm, for horizontal x- and y-direction and 0.1mm for the vertical z-direction and thus allowing 3D-monitoring of all the direct and inverted pendulums.





Huggenberger Telependel-Messsysteme messen die Pendeldrahtkoordinaten im Bereich von 150 x 60 mm automatisch, berührungslos und kontinuierlich. Lichtquellen im Instrument verursachen einen Schatten des Pendeldrahtes, der von Hell-Dunkel- Sensoren erfasst wird. Die genaue Position des Pendeldrahtes ergibt sich aus der Position der Lichtquellen und der Schattenbrennpunkte. Der kleine Kegel, der zur Messung der vertikalen Verformungen am Draht befestigt ist, beeinflusst die Breite des Schattens relativ zur vertikalen Position des Kegels. Dies ermöglicht die automatische Erkennung der vertikalen Verschiebungen des Dammfundaments innerhalb eines Bereichs von 20 mm und mit einer Genauigkeit von +/- 0,05 mm.

Die Instrumente können ohne Demontage des Lotmesssystems installiert werden und sind, dank des sehr stabilen universellen Trägersystems, einfach auf die richtige Messachse und in der richtigen horizontalen Neigung auszurichten.

