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ADCP measurements and echo sounding of the Intake and reservoir at the hydroelectric power plants Inga I+II

Client: Fichtner GmbH & Co. KG

Location: Inga, Democratic Republic of Congo

Construction: Intake and reservoir of the hydroelectric power plants Inga I+II

Scope of work: Surface measurements of the bottom, Measurements of water velocity and discharge

Methodology: ADCP Workhorse Rio Grande, 2-frequency echo sounding, pressure sensors type Mini Diver

Introduction

Since initial startup of the hydroelectric power plants Inga I+II sedimentation took place at the intake and reservoir (Fig.1). Therefore, especially while dry season, the power plants are limited in performance due to lack of water. We were commissioned with the echo sounding of the bottom, measurement of flow velocity and recording of water levels as a basis for an hydro- and morphodynamical model

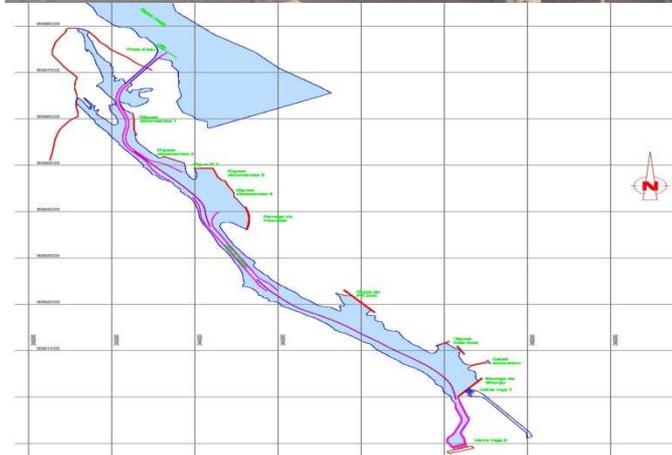


Figure 1: Dam wall of Inga I + II (upper fig.) and overview of the whole system (lower fig.)

METHODOLOGY

On known benchmark points a DGPS base including radio transmission were build up to establish the high accurate echo sounding (Fig. 2) in RTK mode and the ADCP measurements (Fig. 3). Using a 7 parameter transformation the local coordinate system were shifted into UTM system. For recording water levels we used 5 very precise pressure cells of typ Mini Diver.

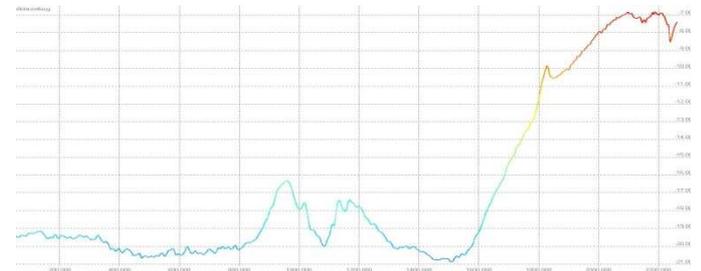


Figure 2: Echo sounding survey line

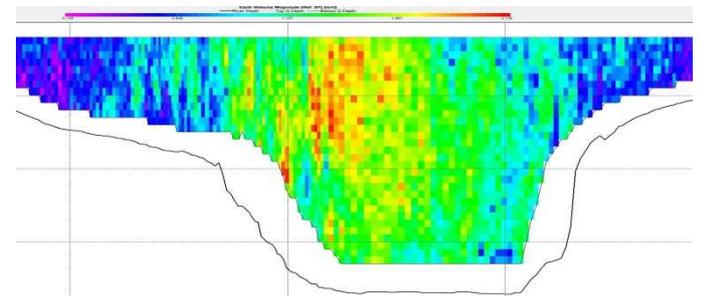


Figure 3: ADCP flow pattern

RESULTS

After analysing the results of the echo sounding the presence of sediment in the reservoir as well as submarine thresholds located at the intake from the congo could be evidenced. The measured flow velocity and discharge are in conformity with the summarized values of the turbines.