Von Bach Dam Receives Major Facelift

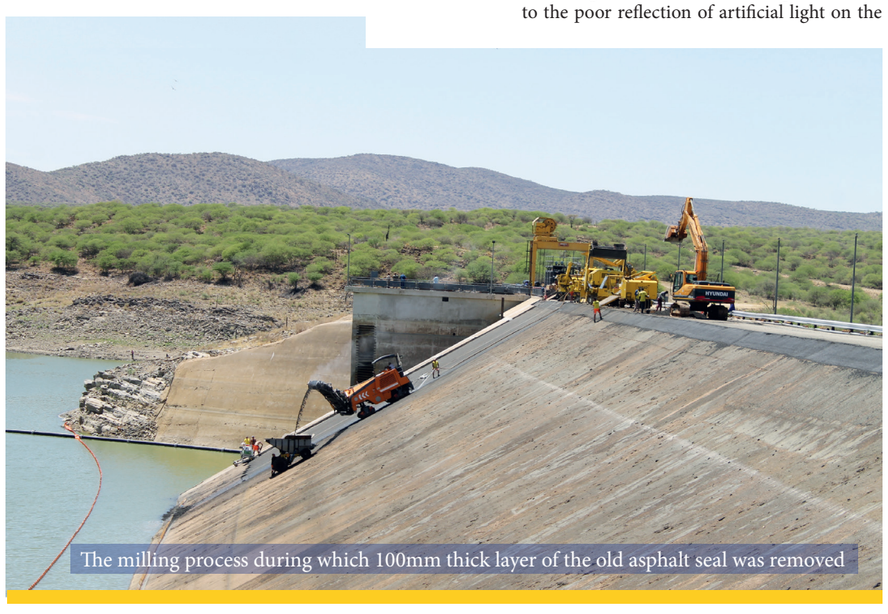
The paving process underway

The Sartorius Von Bach Dam (Von Bach Dam), situated east of Okahandja in Otjozondjupa Region, has recently received a new bituminous seal layer after approximately 50 years of service. The previous asphalt seal had become brittle, due to loss of volatiles from the bitumen, which typically leads to cracking on the surface of the asphalt.

Knight Piésold Consulting (KP) was appointed to perform an inspection of the old asphalt seal early in 2016. Results of core drill samples and a visual inspection led to a conclusive outcome; the asphalt seal needed to be replaced as soon as possible to avoid a probable uncontrolled loss of water should the dam fill up again.

Construction of the Von Bach Dam commenced in 1967 and was completed in 1970. The dam structure is referred to as a concrete faced rockfill dam (CFRD) of which the watertight lining on the upstream side is not a conventional concrete seal, but a specially designed hydraulic asphaltic seal. This type of sealing mechanism is often used in Europe and North America for dams as well as watertight membranes for landfill sites when leachate is not permitted to enter into the groundwater, but must be collected and treated. The advantages of an asphalt seal is its ability to flex and move with settlement of the supporting embankment structure, opposed to rigid concrete face dams, of which several have failed over the last decade due to the inability of the concrete to flex and compress along the lower upstream face.

A three-year draught in Namibia reduced water levels in some dams, including the Von Bach Dam, to well below 10%. These low water levels, last seen in 1996, provided an ideal window of opportunity to maximize the area of refurbishment for the exposed asphalt seal. It was recommended to fast-track the appointment of a contractor and repair the membrane before any possible significant inflow occurred into the dam from the approaching rainy season.



The milling process during which 100mm thick layer of the old asphalt seal was removed

NamWater appointed a contractor through a tender-exemption rather than a full tender process, enabling site establishment to start at the end of October 2016. Preparation work commenced early in November, but due to unforeseen delays with obtaining neccessary abnormal road transportation permits by the Walvis Bay port authority and the Namibia Roads Authority, the large winch and milling machine arrived several days late. The contractor, WALO International AG (WALO), fully understood the consequences of delaying the completion date, and set off at a blistering pace to catch up on delayed time, working 12 hours daily: night shift work was not possible due to the poor reflection of artificial light on the black asphalt surface - quality control would have been problematic.

Construction work entailed milling away a significant portion of the old asphalt membrane, and replacing it with a new 70mm thick asphaltic drainage layer and a new 70mm thick dense asphaltic seal (also referred to as dense asphaltic concrete (DAC)). Batching of the new asphalt was performed by a sub-contractor, MUCH Asphalt, at their batching plant at the Aris Quarry, south of Windhoek.

The project was well planned and executed and despite late commencement of the construction work, WALO still managed to complete the work on time, by middle December 2016, several days before the first summer rains started filling the dam. The dam currently stands at over 60% full.

NamWater expressed its satisfaction with the efficiency of the contractor throughout the construction process. Knight Piésold Consulting are proud to have been involved in initiating and overseeing the fast track process, to appoint and supervise the contractor, and to complete the project within the small window of opportunity which was available.

Compiled by: Dr Gert Cloete

WALO paving equipment placing the new asphalt seal over the milled off surface