

iDredge makes alluvial diamond mining easier

Traditional river-based alluvial diamond mining has seen divers scouring the riverbed with heavy suction pipes coupled to centrifugal pumps. New technology, the iDredge, has produced a whopping 14,1 carats from 1,200kg of alluvial/gravel deposits in the Kasai River of the DRC in the first test run.



Thomas Häggkvist, CEO of Africa Resources AB, approached Imilingo Mineral Processing in October 2016 for a possible solution to the cumbersome and hazardous diving conditions involved in alluvial diamond recovery. "Modern mining techniques and sorting technology has been severely lacking in alluvial diamond mining and the iDredge has certainly delivered in injecting some much needed technological advancement in the industry."

The machine comprises a floating platform connected to two pontoons. Dragflow 60Kw submersible pump with high-depth compensators provides suction and allows particles up to 60mm in size to be pumped through the 150 NB pipe. An onboard rotatable crane submerges the pump and is there to make the pump accessible for maintenance purposes. A 150KVA diesel generator supplies power and the mined material is fed onto a double-deck vibrating screen. Both generator and screen remain on the riverbank."

The iDredge has the advantage of being collapsible for transport, making it exceptionally feasible to reach remote destinations."

Jaco Prinsloo, MD of Imilingo, who has extensive knowledge of diamond processing through his experience when working as the lead engineer for DRA on several large diamond mining projects, worked with an innovative team of engineers to design and fabricate the iDredge.

Installation

The iDredge™ began the long journey from Imilingo's Centurion fabrication facility in December 2017. Road transport to the port at Durban took a week and after 17 days at sea, the two 40ft and two 20ft containers arrived at the port of Matadi on the west coast of the DRC. The contents of the 40ft containers were unloaded in the port and loaded onto trucks while the 20ft containers were loaded onto the trucks as-is. From there the trucks hauled the modular components to Kinshasa and onwards to the Kasai River.

"Much of the infrastructure in the DRC, especially the road network, is extremely eroded and this necessitated a change in the site where the iDredge would be used," Prinsloo says. "Originally the machine was destined for the Tshikapa river, but this had to be changed to the Kasai as the latter is more accessible for the large interlinked trucks and their precious cargo."

A technical team from Imilingo accompanied the mining team on their journey to help assemble the machine. The machine was assembled in an excavation made by an excavator, next to the river and the same excavator did duty as a crane for some of the heavier components. When assembled, the excavation was flooded and the iDredge entered the river. Cables were linked to the opposite shore to winch the vessel into position in the centre of the river.

"Rivers in the DRC flow very fast and we had made sure that two very sturdy trees on either side of the river acted as anchors for the cables," Prinsloo explained. "Our client also requested that two outboard motors be fitted on the back of the iDredge as an extra precaution to counter the initial measurement of around 1,7 metres per second for the flow of the river."

Local involvement

Local villagers keen for employment and training assembled the 150 mm pipes using wooden dugout canoes to attach the HDPE floaters to support the pipes in carrying the dredged material to the shore. "Once the pump was started, it effectively pumped sand to reach the river-bottom bedrock. The dredged sand was sized on a vibrating screen and the material was then sifted by hand in what the local people term a 'tammy' that is French for sieve," said Prinsloo.

After the Imilingo commissioning team left, the local site team continued operations and cleared the river bed of sand overburden before reaching the diamond gravel. The first diamond gravel was pumped on the 29th August 2018 and then washed by tammy to recover the company's first diamonds.