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The Direct Screen

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NO MORE TAILINGS DAMS - IDEAL FOR STOCKPILING & BLENDING - CONVEYABLE

END PRODUCT

In most processes in the Mining Industry water is required for Mining and Processing.

With the scarcity and cost of water a predominant factor it is of prime importance to preserve and re-use water by recovering as much as possible for re-use.

With the advent of Magra supplied High Performance Thickeners able to produce "paste", water recovery has significantly improved.

The disposal of paste being of high viscosity and high density makes it very difficult and a costly affair to pump over the distances required.

In 1995 Harold Hester, Consulting Engineer for Debswana challenged me to create a conveyable thickener underflow system.

The challenge remained in the back of my mind and was realised over the past two years when a joint patent between Magra and Metquip was filed.

Successful test work on Coal discard fines culminated in a virtually dry screen product with a low moisture content.

This product can be conveyed to the tailings disposal site or blended with the supply to power stations.

The massive financial and environmental benefits of applying this technology would benefit all existing Coal Mines and have a great influence on feasibility studies if incorporated in Plant Design.

Operation of the Direct Screen

The "DIRECT SCREEN" is a high G-force screen and de-waters discarded product to such an extent that it could either be stockpiled, blended or conveyed with no need for a Tailings Dam and its associated management.

Tailings Thickener Underflow is distributed uniformly over the width of the screen through a primary distribution box situated at the feed end of the Direct Screen leaving a coarse primary layer on the screen panel.

The fines and water passes through the screen and assembles in the primary Underpan.

From the Underpan a pump feeds the slurry to a primary dewatering cyclone. Underflow from the cyclone also discharges into the distribution box where it blends with the Thickener Underflow.

Some fines are trapped in the coarse layer and the remainder fines pass through the screen and into the Underpan.

Cyclone overflow is directed to a transfer tank from where it is pumped to a secondary cluster cyclonebank.

Underflow from the cluster cyclone bank is evenly deposited on top of the already formed coarse layer by means of a secondary distribution box downstream from the primary distribution box.

Cluster cyclone overflow returns to a weir compartment in the secondary transfer tank.

Both Tanks and Underpan are interconnected for free flow from one tank to the other, with a restricting weir in the secondary transfer tank.

Filtrate and fines are returned to the thickener feed tank.

Both Cyclones can run independently preventing the system to run dry in the event of a feed interruption.

Depending on the characteristics of the feed product, the primary cyclone might not be required.

Fines and filtrate being a small portion of the thickener feed, recirculating fines does not present a problem especially should the Magra Ultrasep 2000 High Performance Paste Thickener be incorporated.

Benefits of the Direct Screen.

- a) The environmental impact is reduced to insignificant levels.
- b) Blend washing plant fines with feed to power station and create additional revenue.
- c) Save marginal Mines from closure.
- d) Feasibility of expansion and establishing new operations.
- e) Turn investments into profitability.
- f) Minimise Pollution of ground water and destruction of the environment.
- g) Rehabilitation of existing tailings dams
- h) Cost savings.
 - 1) Tailings disposal cost a fraction of pumping and “normal” tailings management.
 - 2) Water recovery at the plant at levels higher than 90 %.
 - 3) Low maintenance.
 - 4) Minimal Capital required for Tailings disposal.
 - 5) Power consumption.
 - 6). Rehabilitation runs hand in hand with disposal thus requiring a fraction of the capital associated with the closure of operations.
 - 7) Land acquisition.