Carl Hamm

Pipes | Pumps | Solutions

VSD
POSITIONING

VSD on surface

When designing a pump dewatering system it is imperative that all the relative participants have an open and frank discussion. Easily said but not easily achieved.

The “Mine” regardless of process or mineral is primarily established to mine and bring product to market. A Mine is a large investment to those who participate. This is irrespective if they are the End user’s, beneficiaries or investment capitalists.

If we consider designing a pump system and the individual departments are asked for input:

Electrical	- Will not see any detrimental effect to having VSD units installed underground.
Mining and Civil	- Will see no problem creating a chamber to house the Equipment.
Ventilation	- Will have no problem with the entire scenario as they are primarily cooling the mine.
Mechanical and Rigging	- Will see no problem conveying equipment into position regardless of level.
Production	- Will be pleased to have the water out the way to achieve meters.

Each department will do the design based on their personal preferences and all will be satisfied that the best solution has been put in place.

If this scenario then undergoes a complete risk assessment and financial and practical evaluation comparing Pro's and Con's.

A mine makes money when the ore is mined and taken to surface with minimal interference and delays and is delivered to market.

Electricity needs to be supplied from point A to point B to power the pumps, fans etc. The consideration now is how can this be done without impacting on others and what it could possibly impact.

- MV or HV will have to be taken into the mine.
- This voltage must be transformed underground or
- MV or HV infrastructure must be installed as required.

- This infrastructure will require a mined chamber, every m^2 mined for the chamber must go to the surface and will at some time hinder production ore movement.
- The Equipment / Transformer and VSD will generate heat which will require additional ventilation and cooling.
- The Equipment must be kept in humid free / pressurized environment.
- The added risk of flooding.
- An increased effort to service and maintain equipment will be required.

It is almost the same as desludging underground and bringing solid waste to surface instead of pumping the mud. The dry waste will eventually hinder the ore conveyance.

Regardless how this evaluated

The installation of the transformers and VSD equipment on surface will reduce costs, be easier to maintain and have no added risk of flooding.

Designing the mine is a joint effort of all parties coordinated by all departments to achieve a common goal.

The bottom line is with all arguments the route of the power and instrumentation remains between point A and point B. It is all about finding the long term solution, involving all departments that benefits all who are involved on the mine.

To design fine system mechanically that is expensive civilly and that is incompatible electrically is of no benefit.

Asking the Ventilation Engineer the impact on heat on running bulk water movement pumps underground versus large submersibles in water with electrical infrastructure on surface. The ventilation cost saving could pay back the redesign in a shorter period than you could ever consider.

Ever compared one lift pumping versus cascade pumping. The saving on reduced equipment will pay back the system in months.

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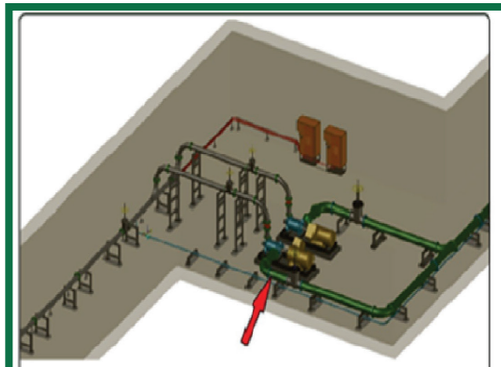
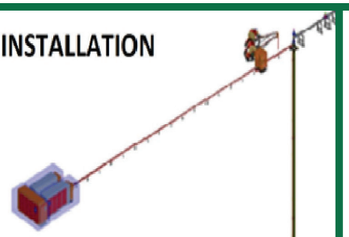


Pump & Motor Head 990m with Q-Flow 900m³/h (250l/s) 3550kw

TYPICAL UNDERGROUND INSTALLATION



1 Riser pipe DN 350 (355,6 x 20 x 11.000), designed for a max. approved pipe length of app. 900m each, no extra hanging weight, the max. allowed shutoff pressure of pump is 1120m.

Suction line DN500 from clearwater dam to Pump suction inlet

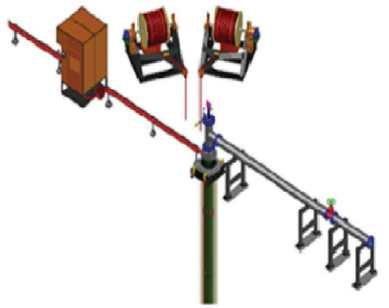
Delivery line 1 x DN350 from the pump Outlet to Connect to the ZSM system 200m

DN80 Surge anticipation line from the DN350 main line back to the clear water dam

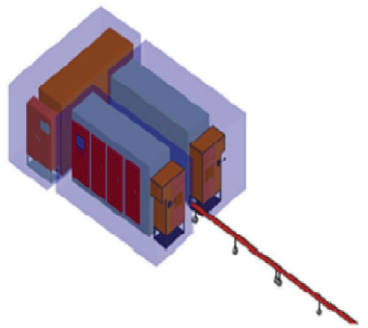
TYPICAL APPLICATION

Flow	900m³/h(250 l/s)
Head	900m
Motor Kw:	3550 kw
Amps:	225 A
Rpm:	1489 rpm
Voltage:	11000 v

TYPICAL SURFACE INSTALLATION



DN350 Header works on Surface & Cable Dispenser for installation of Cables



VSD on Surface - PF6000 3550kw 11kV VSD MV & Electrical Equipment & 11 KV Switchgear

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Competence, experience, innovative thinking, modern manufacturing plants and motivated employees form the basis of our services.

With the flexibility of a modern, medium-sized company and the experience of our over 90-year history, we are well equipped to meet the requirements of the future.

The numerous certifications and technical approvals of course ensure that we serve our customers with the highest quality standards through the complete project phases.

Our product range focuses on water, waste water and power industries, tunnel construction and well sinking as well as open-pit and underground mining.

We as a competent partner ensure an added value for the specific customer needs: from the conceptual planning to professional production and punctual delivery.

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