

Providing electromechanical solutions that defy inclement and demanding ambient conditions

PSY Systems has developed a solid reputation for tackling projects that are challenging in their application and solution, across a number of industries. Two recent contracts – one for a copper mine in Central Africa and another for a water purification plant in Northern KwaZulu-Natal – are perfect examples of the company's fit for purpose approach to solutions.

Paul Young, MD of PSY Systems, explains that the copper mine project called for a complete replacement of the existing, outdated medium voltage soft starters for the shaft ventilation system. Situated 1 000 metres below the surface, conditions are extremely hot and humid, with relief provided solely by the ventilation system. Due to the inclement ambient conditions experienced at such great depths, it is critical that effortless starting of motors is achieved, since any outages can result in unbearable working conditions for miners.

Young says that the company decided to provide a new ABB soft starter electromechanical solution to ensure reliable, energy-efficient starting of the ventilation system motor. This new soft starter was the perfect upgrade option for the current starter which was unable to provide soft starting, which effectively meant it was therefore unable to prevent torque surging on start up.

The ABB SSM Plus Series 6.6 kV starter is easy to use and combines the latest soft starter technology. The project, which was implemented over three days has resulted in a rugged and reliable starting system for the mine's critical ventilation system. "We overcame a couple of challenges with this prestige product. Firstly, the available space in the mine shaft is minimal, so a compact unit was required to ensure the perfect fit. In addition, the adverse conditions underground play havoc with electromechanical products. The ABB SSM Plus Series is designed to cope with demanding and harsh conditions with aplomb," says Young.

The power of the SSM is in the CPU, a microprocessor based protection and control system for the motor and starter assembly. The CPU uses phase angle firing of the SCRs to apply a reduced voltage to the motor, and then slowly and gently increases torque through control of the voltage and current until the motor accelerates to full speed. This starting method lowers the starting current of the motor, reducing electrical stresses on the power system and motor. It also reduces peak starting torque stresses on both the motor and load mechanical components, promoting longer service life and less downtime.

PSY Systems is providing an ongoing maintenance service which includes bi-annual cleaning and support backup in the unlikely event of failure. The client has expressed its satisfaction with the solution provided, with no problems experienced to date.

Water hammering is one of the most serious problems for water pumping applications and needs to be resolved in order to ensure a reliable operation. The ABB PSE series soft starters are proven to eliminate water hammer in a number of water and wastewater applications.

Young points out that the forces of a pipe filled with water are enormous. In a single stop of the motor, this will only cause an unpleasant sound, but water hammering at every stop, day in and day out, will quickly wear out the valves, gaskets and pipe connections. This will increase the need for maintenance, service and repair or even worse, cause unplanned downtime.

A new waterworks in Northern KwaZulu-Natal was required to meet the increasing demand for fresh drinking water in the nearby rural areas. PSY Systems selected the ABB 11 kV medium voltage PSE soft starter to eliminate water hammer. The plant is situated at the last stop on the electrical reticulation grid, in a remote location in the bush. The need for a reliable and durable starter, which would provide both soft start and soft stop operations, was therefore critical.

Young says that it was essential to ensure that the stop start operation did not interfere with or interrupt the main power supply, which would inevitably cause problems for other users. This three-year project calls for tuning of the soft starter timing into the proportional valve opening and closing time to prevent water hammer, something that will ultimately be achieved with the ABB PSE soft starter.