

Circulating Water Pump Bearing Flush Systems

INTRODUCTION

A typical circulating water pump maintains shaft stability with product or external flush lubricated sleeve bearings. The condition of the fluid injected into these bearings has a direct impact on the life of the bearings. The life of the bearings can be dramatically increased by the use of a Bearing Flush System from Filtration Solutions, Inc. This system is engineered to filter out impurities, improve equipment reliability, and increase the Mean Time Between Overhauls.

The system offers a cost benefit by eliminating the need for expensive treated external flush fluids. Typically, the cost of the Bearing Flush System will be less than half the cost of pump removal and bearing replacement.



DESCRIPTION

Filtration Solutions, Inc. has engineered an automated filtration system that removes solids from flush fluids and controls the flow to the pump bearings. These systems are designed to provide proper bearing lubrication flow with superior water quality to maintain maximum reliability. The system can be added to product flush or external flush type systems.



The bearing flush system has a wide range of application but is most often used on vertical pumps in circulating water service. The low heads required for this application allow the use of plastic materials in many components, which is desirable when dealing with seawater applications.

The bearing flush system uses a patented self-cleaning filtration system originally designed for the pre-filtration of US Navy RO (Reverse Osmosis) desalination systems. The filter design makes use of cross-flow filtration for fouling control to enhance the filtration

performance. A special feature called Dean Flow, which is a secondary flow with a double vortex flow pattern, is incorporated into the system and is generated by a patented design. The high shear force of the vortices produced by this feature will keep the filter media surface clean and prolong the filter service life. Also built into the system is an automatic backwash arrangement which generates periodical impulses to unplug the filter media. All these features, cross-flow, Dean Flow, and backwashing, make the system a true self-cleaning innovative filtration system.

Each system is sized according to fluid solid concentrations local to site conditions. A typical system is packaged as a complete unit mounted on a steel skid. The associated components consist of a flush pump, piping, valves, controls, instrumentation, and patented cartridge filters with the properly selected pore size. The component materials are specified to achieve maximum compatibility with the pumped fluid. The system inlet can be an external water source, the CWP sump, or taken directly off the main pump casing.

The system controls allow for manual or automatic operation depending upon plant requirements. If required, the system instrumentation can be designed to supply feedback signals to the DCS. The system can also be designed to supply bearing flush water to multiple CWPs from a single bearing flush system.

BENEFITS

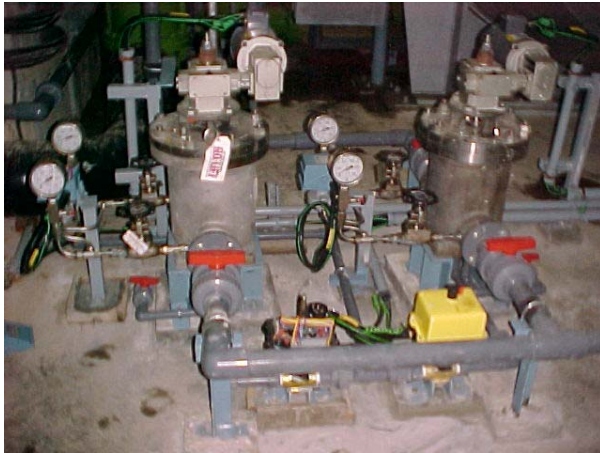
Many OEM supplied CWP systems rely on cyclone separation or small filtered systems. Both types of systems can allow solid carryover to the bearing system and result in shorter bearing life. FSI's bearing flush system will prevent large quantities of solids from destroying the sleeve bearings and provide reliable fluid flow to maintain pump uptime.

Conventional cartridge filters or bag filters are dead-end filters, in which the processed flow is forced to pass through the filter media by the driving pressure. This causes particulate to build up on the filter media surface and results in very limited filter service life. The situation can be exasperating for debris laden flow. The more advanced so called self-cleaning system/auto strainer on the market comes with a rotating blade. The blade can reduce the cake build-up on the filter media surface, but often times the blade also causes sludge to be extruded through the filter media during the wiping motion. The rotating blade mechanism also creates extra moving parts in the system which means extra maintenance and liability concerns. Overall, the bearing flush system offered by FSI not only provides superior processed flow for bearing flush but also greatly reduces the associated maintenance and operating costs.

Another benefit is the ability of the system to withstand extraordinary operating conditions. For example a violent storm situation can produce periods of excessive agitation of seabed solids and produce very high solid particle concentrations. Many times these conditions are unexpected and can overwhelm a typical installation. FSI considers all possible operating conditions and incorporates this additional strength into the bearing flush system.

External flush systems can also be expensive to operate due to water treatment costs and water supply location (such as city water). Often times, piping water from a supply point to the remote point of use incurs a high installation cost. The circulating water pump bearing flush system cost effectively extends the bearing life and maintains enough capacity without the necessity of using a costly water supply.

Below is an example of a successful installation that utilized the system components to overcome severe water conditions at a power generation facility.



Photos shown are from a system installed in Malaysia where water quality was a major concern. The original system made use of a product flush with a cyclone separator for solids removal. The high solids concentrations in the sump blocked the cyclone separator and caused unfiltered fluid to directly enter the bearing systems. The actual bearing life during the initial installation run was a matter of weeks. The bearing flush system removed the need to constantly attend to blockages and extended the bearing life from weeks to years. By retro-fitting the installed preflush with the enhanced bearing flush system this plant has overcome enormous maintenance and downtime problems and now enjoys reliable and trouble free operation.