

Single Motor Dual Pump System

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Abstract: Nowadays, the centrifugal pumps became very popular because of recent development of high speed electric motors, steam turbines etc. Centrifugal pumps can be single-stage or may be multistage pumps. It depends upon the number of impellers used in the pump. Single stage pump consists of only one impeller while in multistage pumps the impellers are mounted in the series in pumps. These Centrifugal pumps can be analyzed by software code like Computational Fluid Dynamics (CFD). This CFD tool or code helps to optimize the pump performance. The complex internal flows are to be predicted with the CFD code. The optimized pumps are used for various applications like drainage and drinking water system, chemical Industries- Catalyst transfer, acid transfer and neutralizing, waste water/Chemicals- Industrial effluents, purifying water, in process industries- paper pulp, chemicals, and pharmaceuticals etc.

Keywords: Centrifugal pump, impeller, CFD.

INTRODUCTION

The mechanical energy is provided by motor either electrically operated or fuel operated and this pump increase pressure of liquid and this pressure used for doing desired work. So pump is defined as a device hydraulic machine which converts mechanical energy into hydraulic energy. Centrifugal pumps are fluid- kinetic machines designed for power increase within a rotating impeller. According to this principle, the fluid is accelerated through the impeller. In the outlet connection of the centrifugal pump the resulting increase in speed is converted into delivery head. Therefore it is also called the hydrodynamic pumping principle A centrifugal pump containing two or more impellers is called a multistage centrifugal pump. The impellers may be mounted on the same shaft or on different shafts. For higher pressures at the outlet impellers can be connected in series. For higher flow output impellers can be connected in parallel. Continuous working of the centrifugal pumps is essential in process industries such as paper mills, textile mill sand refineries, for non-stop operation of the plants. In such cases reliable functioning of the pump is an absolute necessity. The major objective of this paper is the analysis of component life and frequency of occurrence of problems in a centrifugal pump. A survey was conducted among various research paper related to centrifugal pump and data collected on component life and occurrence of problems in pumps A common application of the multistage centrifugal pump is the boiler feed water pump. For example, a 350 MW unit would require two feed pumps in parallel^[1].

Each feed pump is a multistage centrifugal pump producing 150 l/s at 21 MPa. All energy transferred to the fluid is derived from the mechanical energy driving the impeller. Centrifugal pumps can be single-stage or may be multistage pumps. It depends upon the number of impellers used in the pump. Single stage pump consist of only one impeller while in multistage pumps the impellers are mounted in the series in pumps. These Centrifugal pumps can be analyzed by software code like Computational Fluid Dynamics (CFD). This CFD tool or code helps to optimize the pump performance. The complex internal flows are to be predicted with the CFD code. The optimized pumps are used for various applications like drainage and drinking water system, chemical Industries- Catalyst transfer, acid transfer and neutralizing.

EASE OF USE

The centrifugal pump by using single motor dual casing we can increases the discharge also save the cost. We can use two gear boxes on both side of the motor we can change both liquid flow rates. In case we disconnect the one pump the flow rate decreases with increases in pressure. When these two pump are connected in series the pressure increases and also the flow rate increases in little. In such case the 1H.P motor are not multistage because the multi-staging is not possible in such cases. These project model give the large amount of discharge under the moderate head.

LITERATURE SURVEY

Nagendra Sharma, Pushpraj Singh Rathore, Abhishek Rohilla [2015] “A Review Paper on Effect on Performance of a Centrifugal Pump” in that paper they had studied the problems commonly encountered in a centrifugal pump are leakage, excessive noise, excessive heat, suction clog no-pumping, and damage of its components. Major reasons for

the failure of a pump are excessive stress, reduction in strength of its component, variation in applied load, and poor design. Continuous working of the centrifugal pumps is essential in process industries such as paper mills, textile mills and refineries, for non-stop operation of the plants. In such cases reliable functioning of the pump is an absolute necessity. The major objective of this paper is the analysis of component life and frequency of occurrence of problems in a centrifugal pump. A survey was conducted among various research paper related to centrifugal pump and data collected on component life and occurrence of problems in pumps^[1].

A Centrifugal pump is one of the rotating machines that are widely used in various industries such as petrochemical, water treatment, power generation, agriculture, fertilizers, oil and gas, etc. During its operation, it can experience failures which can potentially cause disruption of production processes. Early detection of faults in centrifugal pumps can reduce energy consumption, service and maintenance cost, increase reliability, lifecycle and safety, therefore, significantly reduce through-life-time costs. Centrifugal pumps are turbo machines used for transporting liquids by raising a specified volume of the flow to a specified pressure level. The basic centrifugal pump components are: the casing, the bearing housing, the pump shaft and the impeller. A centrifugal pump, also known as a centrifuge pump, uses an impeller as the primary source for its pumping action. The impeller is similar to a fan with a housing that has one small intake and a larger output, which is simply an opening. The impeller is connected to a spinning rotor that must be moved with mechanical power, in order to displace fluid. The impeller is inside a housing that lets fluid escape to a discharge pipe, where the fluid is pushed after being displaced by the impeller. A pump configuration of the components may vary depending on the fluid-flow direction that can be radial, semi-axial or axial. Axial flow pumps achieve larger flow rates than radial pumps and are used in drainage control, power plants and process

FUTURE SCOPE

By providing gear box in the place of gears arrangement we can change the speed ratio and hence we can change the discharge of liquid. Whenever we can use two gear boxes on both side of the motor we can change both liquid flow rates. In case we disconnect the one pump the flow rate decreases with increases in pressure. When these two pump are connected in series the pressure increases and also the flow rate increases in little. In such case the 1H.P motor are not multistage because the multi-staging is not possible in such cases. These project model give the large amount of discharge under the moderate head.

CONCLUSION

The centrifugal pump by using single motor dual casing we can increases the discharge also save the cost. We can use two gear boxes on both side of the motor we can change both liquid flow rates. In case we disconnect the one pump the flow rate decreases with increases in pressure. When these two pump are connected in series the pressure increases and also the flow rate increases in little. In such case the 1H.P motor are not multistage because the multistaging is not possible in such cases. These project model give the large amount of discharge under the moderate head.

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