COMPUTATIONAL FLUID DYNAMICS ANALYSIS OF IMPELLR DESIGN FOR A PUMP

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ABSTRACT

The main objective of this present investigation is to design and analyse pump impeller to give better performance than the existing once. Designing impellers are important for fluid flow analysis for a pump. The impeller of an existing industrial pump was analysed and redesigned using an integrated, design/analysis, turbo machinery geometry modelling and flow simulation system. The purpose of the redesign was to achieve improved impeller performance. To improve the efficiency of pump, computational fluid dynamics (CFD) analysis is one which is used in the pump industry. In the present model Acrylonitrile butadiene styrene (ABS) material is used to reduce noise and cutting down the cost of the impeller. The number of impeller blades is proposed to increase from 6-8 to 16 in order to increase fluid velocity. Inlet blade angle is reduced to less than 35 degrees from greater than 55 degrees to increase efficiency and outlet fluid velocity of the impeller. From the CFD analysis to calculate the efficiency of the existing impeller by using the empirical relations. In the first case outlet angle is increased, and in the second case inlet angle is decreased and they are obtained from the CFD analysis.

KEYWORDS: Computational Fluid Dynamics (CFD) Analysis, Impeller Design, Pump