

MANAGEMENT ANALYSIS OF ELECTRIC ENERGY UTILIZATION AND POWER EFFICIENCY OF THE USE OF 3-PHASE AC MOTORS AS CENTRIFUGAL PUMP DRIVES IN PDAM TIRTA WIJAYA CILACAP BASED ON CFD

Husni Mubarok

*Electrical Engineering Study Program, Faculty of Science & Technology
University of Technology Yogyakarta
Jl. Ringroad Utara Jombor Sleman Yogyakarta
E-mail : husni.mubarok1019@gmail.com*

ABSTRACT

The 3 phase induction motor is an alternating current (AC) motor that is most widely used for purposes in the continuity of industrial processes. In this research, a three-phase induction motor is used to drive the centrifugal pump used at PDAM Tirta Wijaya Cilacap. A centrifugal pump connected to a three-phase induction motor produces fluid impulse in the form of water which will be distributed to the community. From this process, head losses are produced which are caused by water passing through the pipe. Head losses are divided into two, namely major losses and minor losses. From this research, the results of head losses from two installations were obtained, namely the pipe installation currently in use and the repair of the pipe installation. The current pipe installation head losses value is 8.41 meters for major losses and 15.26 meters for minor losses, while the total head losses are 23.67 meters. The head losses value for pipe installation repairs is 6.04 meters for major losses and 10.15 meters for minor losses, while the total head losses is 16.19 meters. The result of head losses is a reduction in the power efficiency value of the motor. The average motor efficiency of the pipe installation currently used is 48.612% with a power loss of 69.84 kW. Meanwhile, the average value of motor efficiency when repairing pipe installations is 56.394% with a power loss of 57.70 kW. From the power efficiency research, PDAM Tirta Wijaya Cilacap can also estimate motor operating costs that must be incurred for one month as well as cost losses due to power losses. The motorbike operational costs that must be paid for one month are Rp. 13.146.120. For the current installation, the loss cost is IDR 6,243,210 and the repair installation is IDR 5,189,610.

Keywords: *Motor, pump, head losses, efficiency.*