Natsamut Ekkaphapsakol 2012: Improvement of a Water Pump Performance with an Inverter for Using in Fire Protection System. Master of Engineering (Fire Protection Engineering), Major Field: Fire Protection Engineering, Faculty of Engineering. Thesis Advisor: Associate Professor Surachai Radagan, Ph.D. 48 pages.

This thesis studied the improving of the capacity of Fire Protection System by increasing a water pump performance with an inverter to be able to supply water for 8 sprinklers in the event of fire. In this research, the test of the rising of the flow rate and the pressure head consists of a water pump coupled with a Totally Enclosed Fan Cooled by a 3hp motor, 50 Hz of frequency at 2850 rounds per minute, and an inverter. The test used the inverter to increasingly control the frequency and speed of the motor for raising the flow rate and the pressure head of the water pump as a constant impeller diameter of Affinity law. As for the test method, there would be the measure of the flow rates and the pressure heads at 50 Hz of frequency when all sprinklers were closed, and then the flow rates and the pressure heads were measured right after each sprinkler was opened until all of them completed their job. There would be the same test loop with the addition of the frequency from 50 Hz to 90 Hz. After the operation, the result showed that the flow rate and the pressure head of water pump could be increased from 146 gpm, 24 psi at 50 Hz to be 169 gpm, 31 psi at 60 Hz, and 155 gpm, 29 psi at 70 Hz. Accordingly, the test result completely complies with NFPA 13D, and NFPA 13R specifying that the flow rate is not less than 13 gpm per sprinkler to the number of design sprinkler, 104 gpm per 8 sprinklers, and the minimum operating pressure of any sprinkler shall be 7 psi.

As a result, the rising of the frequency to be 60 Hz and 70 Hz could increase the flow rate and the pressure head of the water pump. However, the missions of 80 Hz and 90 Hz were not successful according to the Affinity law because the brake horse power is insufficient, the size of the limited discharge pipe is too small, and an amount of sprinkler is not enough for the increased flow rate.

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