EXPERIMENTAL STUDY OF CAVITATION PHENOMENA ON A CENTRIFUGAL PUMP IMPELLER WITH FRESH WATER AS THE WORKING FLUID

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Abstract

In an industries equipt with pump and piping system to deliver fluid, whether it is fresh water or the others, cavitation is a problem mainly occured. Cavitation is a phenomena which vapour bubbles form in a region whenever the local pressure of the liquid falls below its vapour pressure. Cavitation forms in pump inlet suction, impellers or at the piping system. The indication of cavitation are the formation of vapour bubbles, noise and vibration. The effect of cavitation is the decreased value of pump performance. Due to continous cavitation at the casing and impellers, pitting are formed in the wall casing and surface of the impellers.

The experiment varies the suction pressure, flow rate and the suspected speed at which cavitation occured at the impeller of a centrifugal pump. To detect cavitation, the parameters used to observe is the thoma number, visualization with pictures and a detected vibration. Pressure distribution and thoma number uses 16 points of pressure tab at the pump casing. Visualization uses high speed camera and a digital camera. As for the vibration, using CSI RBM 2120 A.

The result of the experiment shows the intensity of cavitation in a centrifugal pump is increased at a low thoma number which is 1.4 caused by low suction pressure, flow rate and high speed. In visual, cavitation is shown by the formation of
vapour bubbles at the impeller of a centrifugal pump and the vibration is detected in CSI with the increased of vibration energy at high frequency in random.

Keywords: Centrifugal Pump, Cavitation, Fresh Water, Thoma Number, Visualization, Vibration