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EXPERIMENTAL INVESTIGATION AND ANALYSIS OF THRUST (PART) IN V4 SUBMERSIBLE PUMP-A REVIEW

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Abstract:-Pumps are used in many industrial, commercial, agriculture, and residential application of particular in handing water. So it is quite necessary to find out the defect in all parts like, bearing, thrust, shaft, etc. But we are more concentrated on thrust part of the submersible pump. The entire paper work is deal with defect in thrust. A thrust is failed due to overloading, overheating, etc. by modifying material of thrust with the help of experimental investigation. By changing material, efficiency of the submersible pump could be increases. Finally, analysis could be done on same.

Keywords: - Efficiency, overloading, thrust bearing, overheating, reduce defects.

I. INTRODUCTION

Pumps are used of different application like, commercial, industrial, agricultural, etc. the submersible pump used in installation are multistage operating in vertical position although their constructional and operational feature. The basic operational principle remained the same. Produced liquids, after being subjected to great force caused by the high rotational speed of the impeller. This is the main operational mechanism of radial and mixed flow pumps. The pump connected to the mechanical coupling at the bottom of the pump. Pumps are depending in the range of the bore and bore range consider are deepened on the impeller or rotor size in the submersible pump. S. Manoharan et al. [3] describes a research paper on the overall efficiency improves in submersible pump set with reduction in manufacturing cost using DCR technology. If proper attention is given to limit the various losses such as, Hydraulic losses, Leakage losses, Mechanical losses and Disc friction losses in submersible pump set, then further more enrichment in overall efficiency of submersible pump sets are possible. Marcus O. Durham et al. [4] presented research paper on vibration of the system inherent in its design, manufacturing, and application. In fact the built-in flexibility of these machines that makes them useful in pumping bore well a higher level of vibration be tolerance then in industrial equipments. N. Devarajan et al. [5] represents research paper on due to the adoption of proposed slot design in the existing CFR motor, efficiency of the submersible motor increases by 4% - 5% and hence the overall efficiency of the submersible pump set is also increases. Apart from energy savings, the DCR motor also reduces the production of greenhouse gases and push down the total environmental cost of electricity generation. M. N. NouiMehidi et al. [6] revealed that the ESP system before failure exhibits a gradual evolution towards a chaotic behavior that can be clearly identified through the signal analysis of the recorded data from the motor current. These results open the door on the possibility of developing a new real time diagnostics tool that could predict the failure of the ESP system due to scale build-up and allow better management of the production protocols. Dr. Jianhuahuang [7] discussed on Understanding and applying different levels of survival analysis methodologies to petroleum industry run life data could lead to new insights and interpretations of old data sets. Historical use of straight means and/or medians of failed systems and interpreting them as P50 run life can be very misleading when there is a significant amount of censored data that is not taken into account.

II. BACKGROUND

1928 Russian oil delivery system engineer and inventor Armais Arutunoff successfully installed the first submersible oil pump. In 1929, Plunger Pumps pioneered the design of the submersible turbine pump, the forerunner of the modern multi-stage submersible pump. In the mid-1960s the first fully submersible deep-well water pump was developed [1]. Originally used in Europe, submersible wastewater, foul water, surface water and sewage pumps first were seen in the United States in the mid-1950s. Submersibles pumps are the dominant feature in the pumping station market. A submersible pump includes not only the pump-motor unit, but sophisticated electrical and mechanical controls, piping and wet well with access frame and cover, too. The submersible solids handling sewage pump operates under water and is flood-proof. It is designed for single or dual, wet-pit use and can be removed easily for maintenance [2]. The

submersible wastewater, foul water, surface water and sewage pump became popular in the early 1960s, when a guide-rail system was developed to lift the pump out of the pit for repair. This ended the dirty and sometimes dangerous task of sending people into the sewage or wet pit. Growth of the submersible for wastewater pumping since has been dramatic, as an increasing number of specifies and users learned of its advantages. Two classes of submersibles exist. The smaller units, commonly called sewage ejectors, are used in home and light commercial applications; they normally handle up to 55mm spherical solids and range from 0.75kW to 2.2kW. Larger submersibles handle 65mm and larger solids and have a minimum of 80mm discharge. They are used in municipal and industrial applications for pumping sewage and all types of industrial wastewater [2]. Large and small units are used in a variety of ways in the home, farm, hotel, school, marine, commercial building, industrial plant and municipal sewage and storm water pump systems. Submersible pumps have been proven over the last half of a century, disproving those skeptics who originally questioned how an electric motor-powered pump could run under water. Originally developed in Europe, millions now are used daily throughout the world to pump clear water, raw water and wastewater [2].

III. METHODOLOGY

Now days, it is quite necessary to find out the defect in all parts like, bearing, thrust, shaft, etc. But we are more concentrated on thrust part of the submersible pump. Different types of Bearing material like, Teflon, fiber, graphite, carbon graphite etc. and thrust material like, S.S-410 and S.S-304 and different size of submersible pump are available V3, V4, V6, V8, V10. We are concentrated on V4 submersible pump and thrust part. We are defining the thrust material properties compare to other material properties. With the help of experiment, find the new material for thrust compare to S.S410 and S.S304 for efficiency & benefits purpose of V4 submersible pump. By changing material, efficiency of the submersible pump could be increases. Finally, analysis could be done on same.

IV. CONCLUSION

By performing the experiment, find the new material for thrust (part) in V4 submersible pump based on temperature ranges. Analyses the experiment result with existing data. And finally thermal analysis (software analysis) could be done on same.

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