SELECTION OF INDUCTION MOTORS FOR PETROLEUM PRODUCT PUMPS AND ITS ECONOMICS

by
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Abstract

This research thesis outlines the necessary guidelines and methods to select the most suitable Induction Motor for a Petroleum Product Pump, having a variable load pattern. Conventional way to select a motor for a particular pump is based on the assumption that the motor operates nearly at its rated power continuously throughout the full operating period. But, Petroleum Product Pumps, which are connected to Product Gantries, have variable loads varying from zero to rated power (i.e. most of time low efficiency under load condition with high losses) as demanded by Gantries. This scenario opens the door to carry out studies to investigate the available and the new possibilities to select a proper size motor without exceeding its mechanical and thermal withstanding capabilities for the same load pattern (say, Loading Induction Motor beyond its Name-Plate ratings).

First, the existing pump drive systems at Ceylon Petroleum Corporation were studied together with their present performance and working environment to gather better ideas. Simultaneously, a survey of Induction Motors available in the national/international markets was done considering their types, performances, specifications and costs.

Standards were important for this task and all relevant standards were collected from various Standards Institutions, locally and internationally.

After the basic studies, two product pumps (which were connected to 50HP motor) at Kolonnawa Terminal, feeding both Diesel and Kerosene products to Gantry "A" and "B" were selected to collect operating data. The available data were analysed by using the method (developed) of Equivalent Continuous Motor Size as the case study.

Finally, the results (i.e. Equivalent Continuous Motor Size) were compared with the available

motors to secure Economical and Technical advantages.

Ultimately, the most suitable Squirrel Cage Induction Motor for a Petroleum Product Pump for a given Loading Pattern and Working Environment was decided.

Declaration

I hereby declare that the work presented in this report is my own work and not has been submitted earlier or concurrently for any other degree.

Signature : ....

Name : P. P. C. Dissanayake

Date : 28/12/2004

I certify that this work was supervised by me and the above declaration is true.

UOM Verified Signature

Signature : ....

Name : Dr. J. P. Karunadasa

Date : 28. 12. 2004

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List of Figures

List of Tables & Charts

Contents