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Optimizing Condition Monitoring Techniques Applied to a Three Stage Reciprocating Compressor in a FMCG industry

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ABSTRACT

Reciprocating compressors play an important role in maintaining an efficient productivity in the FMCG industry. Any unpredicted breakdowns and faults would lead to high maintenance and operational costs. In the mean time, many different techniques have been developed for condition monitoring. However, the performance of techniques is highly application dependent.

Therefore this research will investigate into the development of a robust and cost effective system for the condition monitoring of large reciprocating compressors in a FMCG industry. Different types CM techniques will be reviewed to identify the suitability for a 40bar three stage compressors. The measurement system, signal analysis and data management will be then developed based upon this compressor. In the meantime the techniques will also be evaluated head by head based on a smaller compressor in laboratory.

To achieve the aim, a number of milestones will be planned as following:

1. To gain the general knowledge of condition monitoring systems in the market and research community through intensive research and literature review.
2. To study about the function of the data acquisition.
3. To familiarize with Matlab software, write some programs, simulate under different operating condition.
4. To study the behavior of three phase electric motor.
5. To design and build a comprehensive reciprocating compressor test facility in the lab where faults would be seeded in order to gain experimental data on the subsequent system behaviour which could help in evaluating the methods that will be developed for the factory.
6. To introduce specific, quantified faults into the compressor and to determine the effects on compressor performance.
7. To develop a system including data measurement, processing and management for the condition monitoring of a 40bar compressor in the company where the author is working.

Keywords: Condition monitoring, Reciprocating compressor, FMCG industry, Predictive maintenance