

Long-term vibration monitoring of induction motors in the food industry with low-cost accelerometers

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Many production lines in the food industry, that run continuously 24 hours per day, are nowadays equipped with induction motors to drive machines to process raw materials to become final products. As the motor function in the production lines is vital, the motors failure can thus interrupt the production process that eventually leads to economic losses, i.e. higher production cost.

The statistical analysis on the maintenance record of a specific production line conducted in this study confirms that induction motor breakdowns are the major contributors of the unplanned production downtimes. Furthermore, this case study also shows that the common failure mode of the induction motors is due to rolling element bearing faults, which is inline with the findings of many authors in the literature.

The main interest of the production line owner is how to minimise the unplanned downtimes such that the productivity is increased and the production cost is minimised. In this paper, we present a testimonial story of a setting-up a vibration monitoring system to continuously monitor the condition of motors for the first time in a real production line with MEMS-technology-based-low-cost accelerometers available on the market [1]. Some technical challenges and the state-of-the art techniques used to compute health indicators from raw vibration signals are presented in this paper. The vibration monitoring system has successfully identified a damaged bearing in one of the monitored motors. This finding was also independently validated by a maintenance service company.

Reference:

[1] A. P. Ompusunggu, T. Ooijevaar, B. Kilundu, S. Devos, ***Automated Bearing Fault Diagnostics with Cost-Effective Vibration Sensor***: Proceedings of the 12th World Congress on Engineering Asset Management and the 13th International Conference on Vibration Engineering and Technology of Machinery.