

Prediction of Remaining Useful Lifetime of Bearing Components

Master Thesis Project Proposal

Background

ABB has been conducting research and development in the area of condition monitoring, diagnostics and reliability in last decades in different fields and applications. Bearings are an example of critical component which have obtained intense attention for monitoring and diagnostics. These bearings are often the component in a system which is most liable to fail and as a result there are a large variety of diagnostics methods available. These methods are primarily based on vibration measurements with spectral analysis and shock pulse methods giving clear indications of fault types and locations. With proven methods of evaluating the current condition of rolling element bearings available, attention has turned to prognostic approaches predicting the health of a bearing in the future. Oil debris analysis, here the amount of Fe particles in oil, is also proven to be an accurate method of obtaining early indications of faults. Furthermore, the information obtained thereby could be extremely useful for multi-sensor data fusion.

The target for the proposed master thesis work is primarily to investigate and develop a model for prediction of the remaining useful lifetime of a certain type of rolling element bearing. This analysis will be mainly data driven using the available oil debris data observed from the field and experiments including clear failure cases. Advanced statistical and signal processing methods will be used for model development as well as online prediction of remaining useful lifetime (RUL). *The challenge here among the other would be to include the measured operational variables into the model.* The recommended development environment will be Matlab for this project.

Proposed activities:

- Extensive literature survey earning knowledge on state-of-the-art.
- Prepare and preprocessing of the field data.
- Exploratory data analysis.
- Evaluation of different method candidates.
- Develop the RUL model.
- Verify/ improve the model by simulation vs. incoming online data.

Contact:

Send in your CV and register your interest in the ABB database:

http://www.abb.se/cawp/seabb366/fe9c28f806e31ebdc12578b2004d7025.aspx?configurationId=Z_UNREG_SEARCH&cuiconfigurationid=Z_UNREG_SEARCH&cuiparameter=cGd1aWQ9NTE2REZDRjkyNUNFMZCMEUxMDA4MDAwMEEzMzEzN0Y=

Do you have any question about the project or how to apply please contact, Dr. Kari Saarinen or Dr. Shiva Sander Tavallaey ABB Corporate Research, Kari.Saarinen@se.abb.com, , tel. +46 21 323093
Shiva.Sander-tavallaey@se.abb.com, tel. +46 21 323193

Starting date: January 2014