

## Documents

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**Gear parameter identification in wind turbines using diagnostic analysis of gearbox vibration signals**

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**Abstract**

The correct diagnosis of faulty components in rotating machines requires a pre-knowledge of the characteristics of the system being monitored and the identification of the frequencies of interest. In gearboxes, the number of gear stages and the number of teeth for each gear are required to calculate the gear mesh frequencies and monitor these frequencies and their sidebands. It is not always possible to have this information available, especially in old equipment. In this chapter a fresh approach is presented to deduce such crucial information from the measured vibration signal. The approach focuses on fine tuning harmonic/sideband cursors to capture different gear mesh families. The approach is illustrated on a signal taken from a wind turbine gearbox, which poses the extra challenge of the variable speed within the measurement record. Results show the possibility of identifying the number of teeth for the first two stages with much more confidence than the planetary stage, where a trial and error approach was used to decide on the most likely combination for the ring, sun and planetary gears. This chapter sets a good practice example for understanding the system characteristics by detailed analysis of the vibration signal using finely tuned harmonic and sideband cursors. © Springer-Verlag Berlin Heidelberg 2014.

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