

PM generator magnetic vibrations

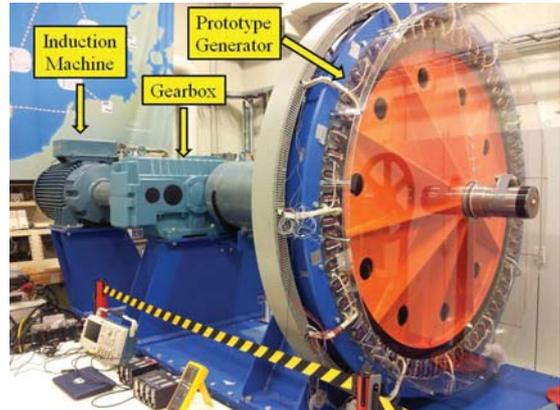
Innovation description

Detailed Analysis (analytical, numerical and experimental) of the vibrational magnetic forces in PM wind generator. Influence of different factors (e.g. pole and slot combinations, slot harmonics and loading) on vibration is addressed.

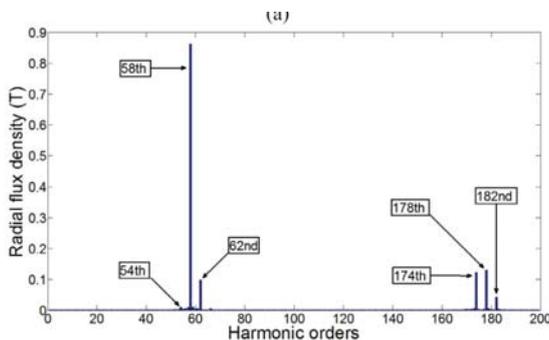
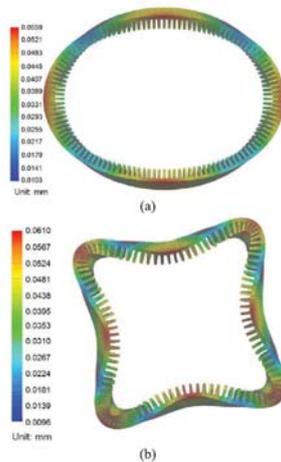
The analysis can be used in the design stage of wind generators to reduce vibration.

Further development

- The model is applied and further developed for research purposes at NTNU



Laboratory prototype for testing



Impact

- The results of this PhD work can be used to reduce the vibration level of PM wind generators. Design guidelines for the generator are addressed.

References

- M. Valavi et al, "An Investigation of Zeroth-Order Radial Magnetic Forces in Low-Speed Surface-Mounted Permanent Magnet Machines", IEEE Transactions on Magnetics, 2016.
- M. Valavi et al, "Effects of Loading and slot harmonic on Radial Magnetic Forces in Low-Speed Permanent Magnet Machine with Concentrated Windings", IEEE Transactions on Magnetics, 2015.
- M. Valavi et al, "Influence of pole and slot combinations on magnetic forces and vibration in low-speed PM wind generators", IEEE Transactions on Magnetics, 2014.
- M. Valavi et al, "Slot harmonic effect on magnetic forces and vibration in low-speed permanent-magnet machine with concentrated windings", IEEE Transactions on Industry Applications, 2014.