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ReliaBlade Problem

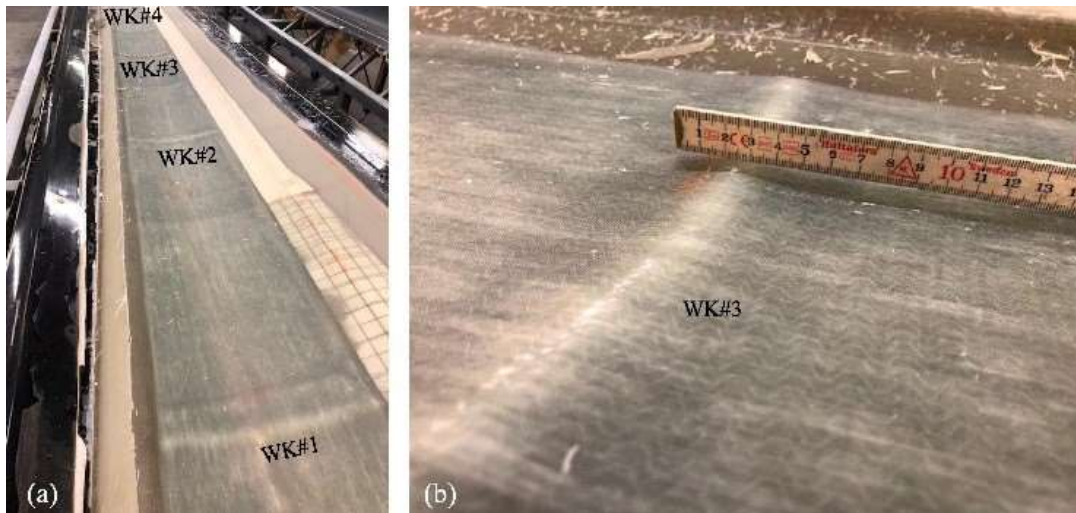
Acoustic Signal in Wind Turbine



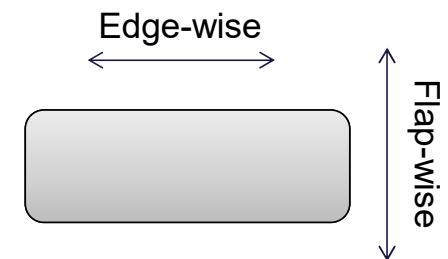
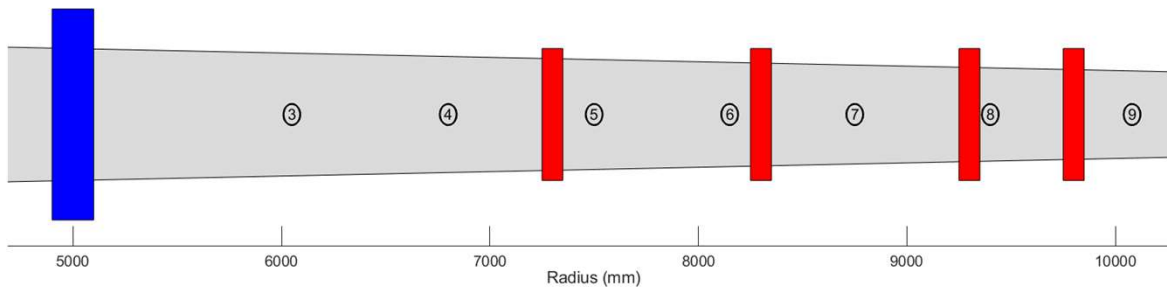
Overview

- The experimental setup.
- What do we measure?
- Results so far.
- What would we like to understand better?

The Experimental Setup

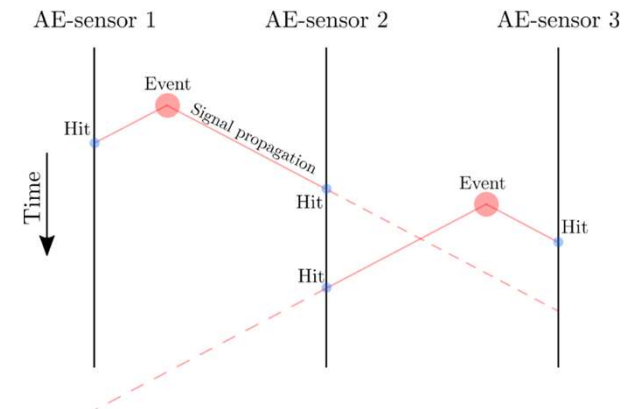
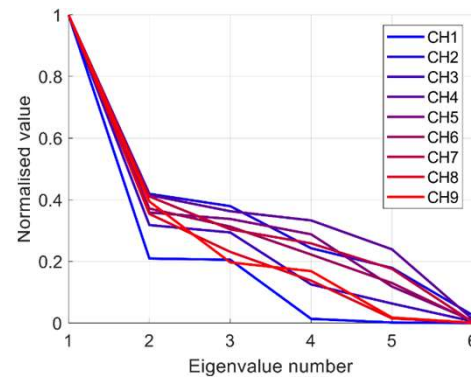
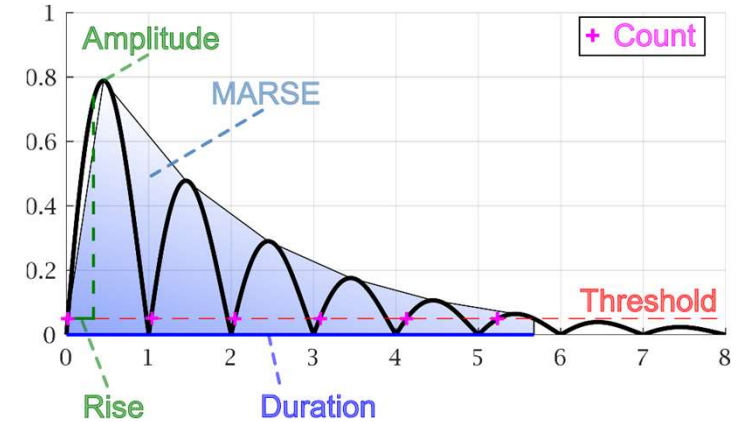


- Four wrinkles are embedded in a 14.3 m wind turbine blade.
- Acoustic sensors are placed along the blade.
- The blade is moved flap-wise and edge-wise.
- Load flap-wise is much larger than edge-wise.



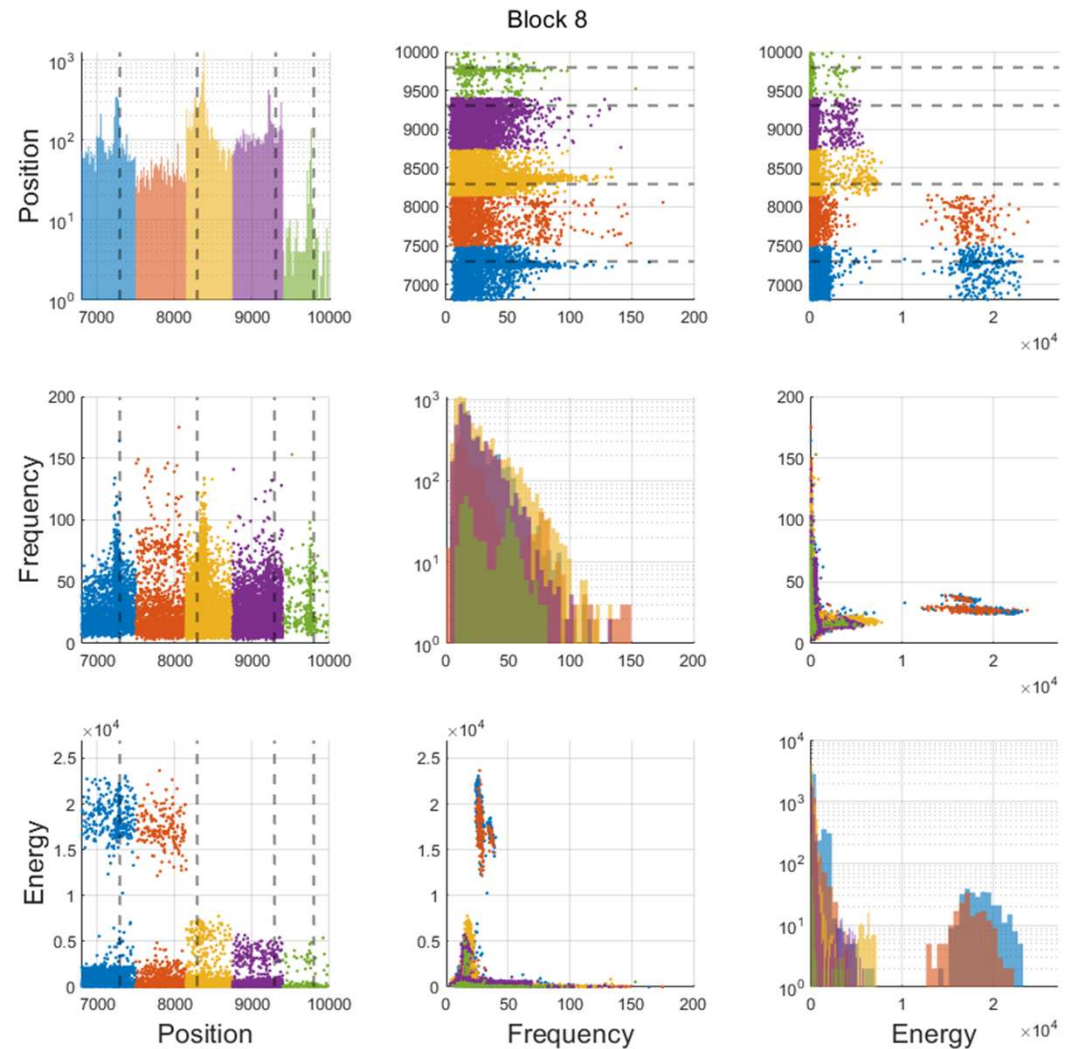
What do we measure?

- Saving raw signal requires restrictively high sampling rate.
- We instead save a number of wave parameters.
- We can also pair sensor hits to localise acoustic events.
- PCA shows that parameters are highly correlated.



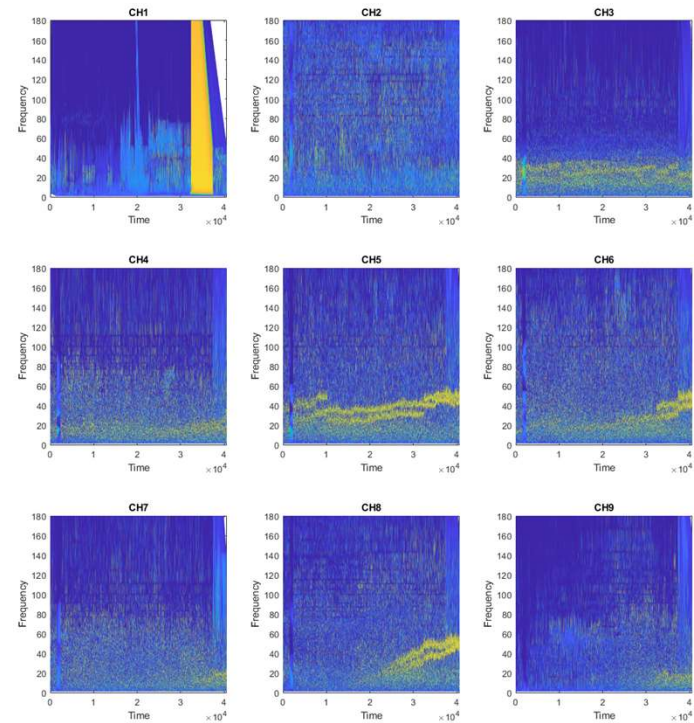
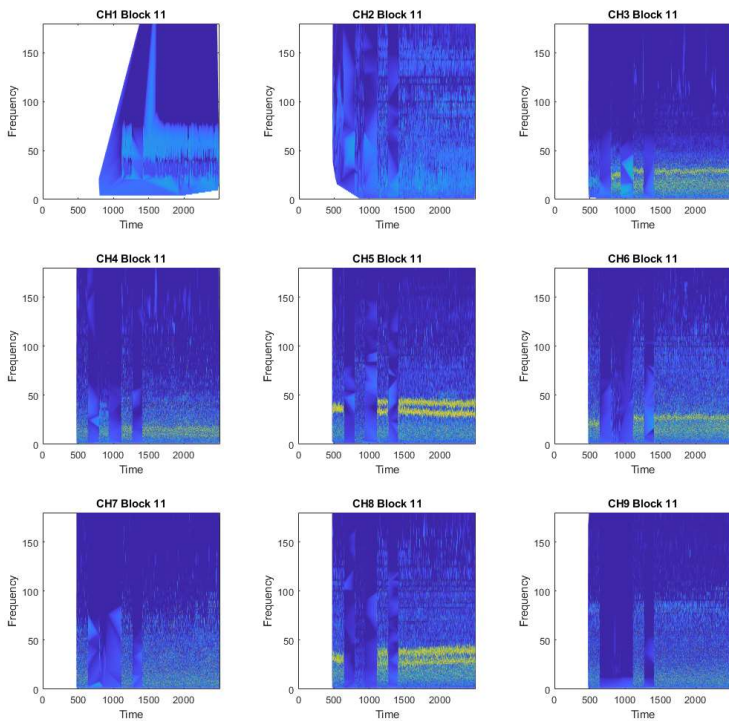
Results so far

- Wrinkles can be seen in the data.
- Based on localisation, high-frequency events seem to come from wrinkles.
- High-energy events seem related to specific frequency bands.



What would we like to understand better?

- Double-band might come from biaxial movement, geometry, and level-repulsion. Does it?
- The wrinkles are growing in size, which would suggest growing wavelength and thus decreasing frequency. Why do the bands increase in frequency over time?



Have fun!