

# VaStBlades

## A TKI-WoZ funded Project

Validation and improvement of Structural models  
for very large flexible Blades

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ECN  
GE  
TRES4  
WMC

SBB Windsystems  
Technobis tft-fos

# Motivation

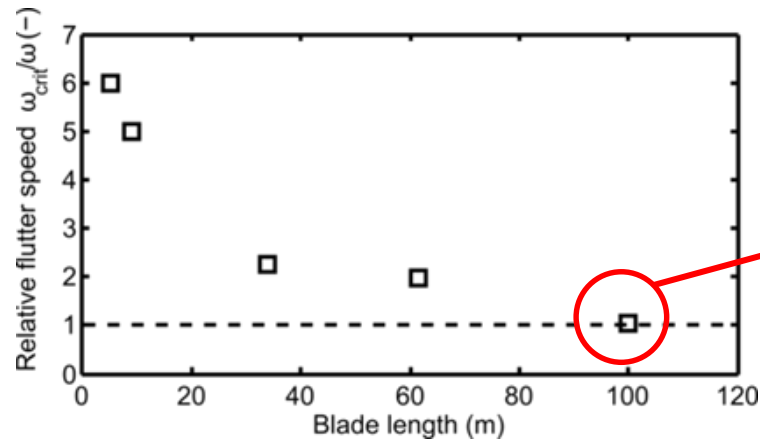
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- Higher capacity factors are an effective method to lower cost of energy ofshore wind power
- Large rotors are effectively improving the capacity factor
- Design of large rotors is becoming more critical and is passing validity and validation limits of the present design tools

# Goal project

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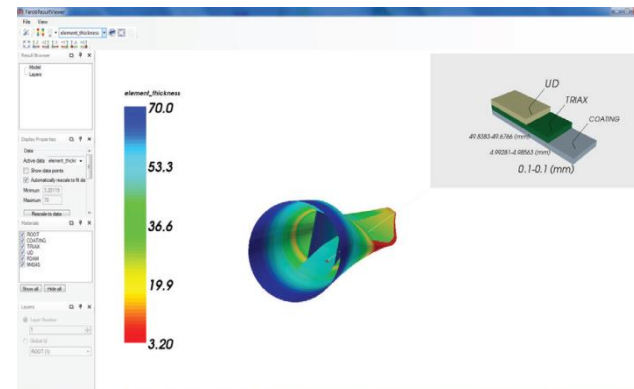
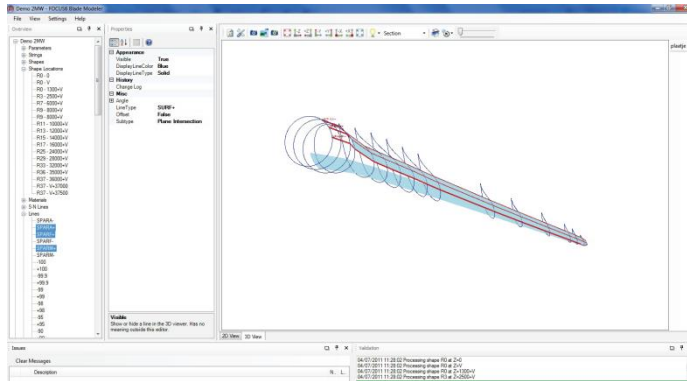
- More accurate designs of wind turbine blades by improved structural modelling and validation of torsional flexibility.
- Example: Flutter behaviour



For a blade design you want the critical flutter frequency to 'stay away' from the dashed line (=operational rotor speed)

# Why improve structural modelling?

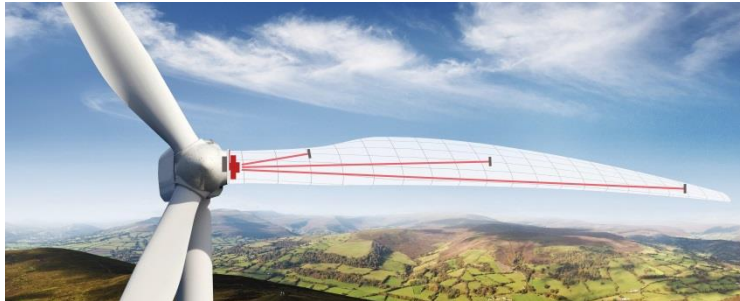
- A large variation in calculated torsional stiffness (up to +/- 17%) was observed in the FP7 EU INNWIND.EU project



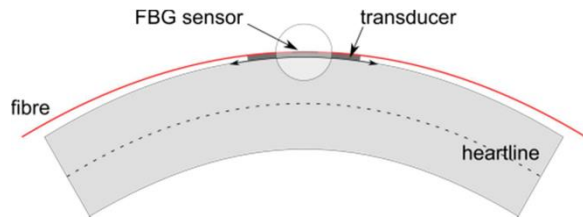
# Why measure blade torsion?

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- Blade torsion is not usually measured
- Validation of structural models
- Blade torsion affects loading and power performance for large blades



SBB wind systems



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# Outcome

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- ACTIVITIES

- Blade torsion test in laboratory (WMC)
- Blade torsion test on full-scale wind turbine (GE@EWTW)
- Modelling and validation of the structural blade model
- Improving models
- Design of a 10MW blade design using improved tools

- OUTCOME

- Datasets with unique validation data
- An improved structural blade model
- Validated aeroelastic tools
- A 10MW wind turbine blade design demonstrating impact of improved tools





Thank you for your attention.