

## TECHNOLOGY PRESENTATION

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### Structural Fuse for Wind Turbines

A sacrificial element with the primary task of absorbing the effects from major natural hazards, rendering the entire wind turbine and its foundation intact.

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#### VALUE PROPOSITION

Recent years have shown a rising tendency and interest of installing wind turbines in environments with previously unencountered types of loading, such as from e.g. earthquakes, tsunamis, typhoons. Whilst the design of regular wind turbines are often driven by fatigue loads, the ultimate-limit-state (ULS) loads may become governing when natural hazards are encountered in the design.

A properly designed structural fuse will lower the structural demands of a wind turbine tower and the foundation in case of a critical natural event, leading to reduced material costs, eventually lowering the levelized cost of energy.

#### BUSINESS OPPORTUNITY

The market of both on- and off-shore wind turbines is rapidly growing, especially in Asia and Northern America. A growing market combined with a high risk of natural hazards entails a favourable business opportunity for companies in the wind industry to improve their competitiveness in such regions by utilizing the current technology.

We are looking for either:

- a licensee, interested in further developing and utilizing the technology through a license agreement
- Investors and/or Partners to collaborate towards a spin-out company, bringing the technology to market



#### TECHNOLOGY SUMMARY

A fuse is normally associated with electrical circuits, acting as a safety component, activated only during critical events. The structural fuse concept utilizes the same conceptual idea as for the electrical fuse. The purpose is to control and isolate potential damage to occur in a specially designed element, which should then be repaired or replaced after a critical event.

The structural fuse is implemented between the base of a wind turbine tower and its foundation. In case of a critical natural event the fuse will relieve both the tower and the foundation from damage.

#### CURRENT STATE OF DEVELOPMENT

Proof-of-concept has been provided through scaled (~1:10) experimental tests followed by realistic analytical simulations of a 5MW on- and off-shore wind turbine, exposed to wind and earthquake loading. Thus, a solid base is formed for interpreting and further developing the technology.

#### INTELLECTUAL PROPERTY RIGHTS

A patent application, Applic. No. 20180100531, have been filed in November 2018 by Aarhus University and the Technical University of Denmark (DTU), who shares the rights.

## INVENTORS



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