

# ReLife Seminar for Wind Turbine Owners

**Date:** Friday, September 23<sup>rd</sup>, 2022

**Location:** DTU Risø campus, Niels Bohr Auditorium, Building 112, Frederiksborgvej 399, 4000 Roskilde, Denmark

## Introduction to ReLife project

ReLife stands for a methodology for assessment of the remaining lifetime of wind turbine blades based on their damage state. The overall purpose of the project is to establish tools that can be used to assess the remaining useful life of wind turbine rotor blades individually. In this way, the extension of the service life is possible and wind turbine blades could operate beyond their original 20 years' service life. Non-destructive inspection techniques (NDT) are developed in the project for assessing blade damages not visible by looking at the surface.

Monitoring techniques as Acoustic Emission sensors are utilized as tools to characterize blade damages during full-scale testing, and will be used as a decision-making tool for inspections. Destructive methods for measuring the material properties of aged wind turbines are also developed.

By use of fracture mechanics models the damage growth can be predicted. Combined, the technologies enable the calculation of how long time it takes until a blade with given damage fails, and the methodology will be demonstrated on older wind turbine blades that have been in service for more than 20 years.

The overall scope of the project is for the wind turbine owners (WTOs) to become the primary users of the proposed methodology, having the chance to operate their assets for a prolonged period of time, becoming more proactive having an increased probability of detectability of damages on wind turbine blades. This information about hotspots in blades will also enable blade manufactures to make better designs for future wind turbine blades.

The vision of the project is to develop both detection and prediction techniques, ensuring a smooth transition between them. It will be achieved by developing a well-defined methodology for determining the remaining lifetime of an asset and provide solutions for safe service life extension. WTOs will be benefited from the outcomes of this project since useful tools will provide them with business cases pointing out improvements on their financial indexes, having the possibility to easily analyze their assets through a dedicated KPIs analysis. WTOs will earn more money by selling more electricity from the same wind turbines for several years more than it was originally planned, and different inspection techniques will be incorporated into the developed business cases, supporting asset managers in more qualified decision making.

For more information about the project, see the project's website: <https://relifeproject.weebly.com/>

The Seminar is chaired by Bent F. Sørensen, DTU Wind and Find Mølholt Jensen, Bladena

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➤ 08:30-09:00	<b>Breakfast and networking</b>
➤ 09:00 – 09:30	Welcome, introduction, and main achievements of the ReLife project by Bent F. Sørensen, DTU Wind
➤ 09:30 – 10:30	O&M Risk related topics presented by Javier Ozores Arconada, Bladena (WP7): <ul style="list-style-type: none"> <li>- New trends on structural damages – Acoustic Emission sensors as a risk mitigation tool</li> <li>- Risk based maintenance strategy with support of software tools and traditional risk analysis</li> <li>- Field experiences using Thermographic NDT method</li> </ul> Presentation from Signe Olsson (Statkraft)
➤ 10:30 – 11:00	<b>Coffee Break and networking</b>
➤ 11:00 – 11:35	Structural damage overview of wind turbine blades focused on main structural failure modes by Bent F. Sørensen and Ioannis Bertios (Bladena)
➤ 11:35– 12:10	Inspections – Monitoring – Measurements presented by DTU and MISTRAS <ul style="list-style-type: none"> <li>- Experiences with Acoustic Emission sensors used in experimental full-scale test by Malcolm McGugan, DTU Wind</li> </ul>
➤ 12.10 - 12.45	<ul style="list-style-type: none"> <li>- Acoustic Emission for crack growth detection and possible shear-web disbonding (fundamental aspects), by Obdulia Ley, MISTRAS Group</li> </ul>
➤ 12:45 - 13:30	<b>Lunch break and networking</b>
➤ 13:30– 14:30	Discussion chaired by Bent F. Sørensen <ul style="list-style-type: none"> <li>- From technical research to industry with risk perspective</li> <li>- Applicability of the methodology from a WTO's perspective</li> <li>- Tools, business cases scenarios, and next steps</li> </ul>
➤ 14:30 – 15:00	Summary of discussion by Bent F. Sørensen, DTU and Find Mølholt Jensen, Bladena
➤ 15:00 - 16:30	Tour at DTUs lab

**Deadline for registration to the Seminar is September 10<sup>th</sup> to:**

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