

Smart Blue Regions Output 4.3 - Transnational blue growth cooperation projects

Project theme: Using aluminium for wind mill infrastructure and for turbine cover

Challenge to be addressed:

OW constructions are getting bigger and heavier, aluminium decreases the weight of construction, there are other benefits of using it in the construction (efficiency of the construction); but aluminium is more expensive than steel.

Expected results:

Prototype design, production (model scaled down?) and verification of the efficiency based on numerical modelling, cost-benefit in-depth analysis.

Target groups:

- Turbine producers,
- Monopile producers,
- R&D (numerical modelling, model tests)

Main activities and timeframe:

Proposal from Paweł Flaszynski (Szewalski Institute of Fluid-Flow Machinery of Polish Academy of Sciences (IMP PAN)): Aerodynamic loading evaluation by means of numerical simulations (3D flow - CFD) and/or experimental investigations in wind tunnel. Numerical simulations for hydrodynamic analysis

Partnership:

Idea proposed by Goetz Linzenmeier (Aluship Technology Sp. z o. o.)

Organisations that expressed their interest at the workshop in Gdańsk 26th April 2018: MOSTOSTAL POMORZE S.A., Siemens Gamesa Renewable Energy,

A&O EXPERT

Possible contribution:

Aluminium is characterised by lower density than steel while exhibiting similar strength, which makes it an excellent choice for reducing the bulkiness of many structures. However, inferior stiffness (lower Young's modulus) requires careful consideration of component shape in order to retain the desired properties while minimizing material expenditure and lowering the overall cost. Using our experience in numerical modelling, A&O EXPERT can provide the necessary design solutions as well as develop and test various prototypes of monopiles, turbine nacelles and other parts (possibly in collaboration with Gdańsk University of Technology).

In general, higher mechanical properties of aluminium alloys are accompanied by lower weldability. This often necessitates the use of special component joining technology, such as steel

inserts to enable welding or fasteners. A&O EXPERT has considerable experience with projects involving aircraft-grade aluminium alloys (7075, 2017A etc.) and various relevant joining methods.

At A&O EXPERT, we can contribute to this project with the following:

- structural shape optimization
- numerical analysis of various designs
- development of part joining technology
- prototyping and testing

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