DMN - Denmark's industrial gateway to solving materials-related issues

dmn
DANISH MATERIALS NETWORK

GOLD Cluster Management Excellence
PROVEN FOR CLUSTER EXCELLENCE

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AluNet PlastNet StaalNet

Danish Materials Network and Denmark's leading wind turbine manufacturers hounding costs

In recent years, the wind turbine industry has worked towards reducing the cost of producing wind energy by 2020. In competition with energy produced from fossil fuels (gas and coal), the cost of producing wind energy is a vital parameter.

A partnership between Danish Materials Network (DMN), Siemens Gamesa Renewable Energy A/S (SGRE) and Vestas Wind Systems A/S (VWS) is working with a number of subcontractors on selecting optimal materials and structural designs to reduce the Cost of Energy (CoE).

The project group agreed to examine secondary wind turbine component parts first, specifically wind turbine tower platforms. The group is investigating if it is possible to reduce the price per square metre of platform by 20% compared to the current price.

Dorte Walzl Bælum, DMN Network Director and Bente Nedergaard Chistensen, Polymer Specialist & Project Manager inspecting internals in a wind turbine tower.

- The choice of materials is of paramount importance to CoE. We are very pleased to have this opportunity to bring our professional skills into play in this respect. This project gives us the chance to contribute to achieving one of the key targets towards making a green source of energy profitable and help maintain Denmark's position as a global leader in wind power, says Project Manager Bente Nedergaard Christensen, Danish Materials Network.

Various materials tested

SGRE currently uses steel platforms whereas VWS platforms are made of aluminium.

The price of these raw materials fluctuates. A further key factor is the time it takes to assemble platform components. It takes much longer to assemble steel platform elements than their aluminium counterparts.

The development project is currently working with two potential solutions. MM Composite A/S and Avanti Wind Systems A/S are working on Proposal 1 and Fiberline Composites A/S and Aalborg University are working on Proposal 2.

The proposed solutions must be adaptable to different tower diameters and suitable for incorporation into future industrial standards for wind turbine platforms.

Two solutions

Proposal 1 has developed a support structure made of aluminium ladders with composite platform decks. A number of prototypes have been produced. Deflection tests and a trial fitting carried out inside a tower shell were all very promising. The benefits of this solution are that the aluminium supporting structure and composite elements are very lightweight and easily assembled.

Proposal 2 comprises collapsible brackets and adjustable, pliable railings (Counter Lever Arms) that can be adjusted to fit any tower diameter. The solution is made in a composite material. The deck can be made of either composite material or aluminium. Mechanical function tests have been carried out on the brackets, the design of which has subsequently been adjusted ahead of new tests.

The partners involved in this project are currently taking further steps to optimise both proposed solutions in order to achieve the desired savings. One of the results of optimisation work is that they have successfully reduced the initial platform deck weight by an impressive 54% and its price by 46% (at tower diameter of 3.8 metres).

If the project succeeds in reducing the total cost of the platforms inside wind turbine towers, there will potentially be significant business opportunities for the participant companies – and more than likely subsequently also for other Danish manufacturers. Finally, it will be possible, all things being equal, to reduce the consumer price of electricity.

Facts about Danish Materials Network, an innovation network

Danish Materials Network (DMN) was founded on 1 July 2014 when the Danish state encouraged the foundation Plast Center Danmark to set up a larger, broader-based network that covered materials in addition to plastics and composites. Plast Center Denmark, which has been awarded a European Cluster Excellence Initiative Gold Label, manages and facilitates DMN.

DMN is an active consortium of representatives from important commercial stakeholders, our foremost universities, colleges, research and technology institutes, research centres and relevant branch organisations, as well as local and regional authorities in Denmark.

Proposal 1 – a support structure made of aluminium ladders with composite plat form decks.

Comtec
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Industry sector: Oil and Gas; Offshore Wind

Industry role: Work Wear; Safety

Profile: We have more then 15 years of experience supplying the offshore oil and wind sectors, we have the experience and knowledge necessary to provide the best service and knowhow. We are proud of our success in aligning our partners' requirements for Personal Protective Equipment to our easily accessible and bespoke webshops. Our aim is to add value and provide cost reduction for our partners.
Located in Esbjerg(DK), Hull(UK), Grimsby(UK) and on the US Northeast coast we are already involved with the current and emerging offshore markets.

COPCO A/S
Vestkraftkaj 4 C - 6701 Esbjerg

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www.copco.dk

Industry sector: Oil and Gas

Industry role: Manufacture or Supply

Profile: COPCO serves the oil and gas industry with a wide range of chemicals and oil products. Our office and tank terminal is located right on the quay side at the Port of Esbjerg.

DAFA A/S
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Industry sector: Offshore Wind

Profile: New solutions, new methods, new technologies and new structures are constantly appearing. DAFA is contributing to development of the sector through its extensive insight into and experience with wind turbines.

This allows DAFA to serve as a trusted business partner offering foam, rubber and plastic solutions which improve turbine functioning – onshore and offshore.

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Industry sector: Oil and Gas; Offshore Wind

Industry role: Consultant; Service

Industry classification: Legal

Danish Export Association
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export@dk-export.dk
www.dk-export.dk

Industry sector: Oil and Gas; Offshore Wind

Industry role: Consultant; Service; Support Organisation; Training and Education

Profile: A membership of the Danish Export Association brings you know-how: Through the Danish Export Association you are included in a professional and powerful network. The Danish Export Association addresses suppliers of components, systems as well as services. The Danish Export Association is a strong partner for Danish companies wishing an international impact.

Danish Marine & Offshore Group
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Industry sector: Oil and Gas; Offshore Wind

Industry role: Consultant; Support Organisation

Profile: Danish Marine & Offshore Group is a member-based supplier association of companies offering products, consultancy and services to the international offshore industry. The aims of the association is to organise conferences and networking events as well as to encourage cooperation between the members to the benefit of the customers.

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Industry sector: All sectors with material related issues

Industry role: Research and Development; Consultancy; Design; Engineering; Support Organization; Training and Education

Profile: Danish Materials Network, DMN, is the official national knowledge center and innovation network for the Danish industry as regards materials. Our Competences: • Knowledge about aluminum, polymers and steel at specialist level • Selection of materials • Statistical planning of experiments • Test of materials – mechanical, thermal and chemical • Bridge building between industry and universities • Matchmaking, networking and sharing knowledge • Arrangement of events • Internationalization • Training courses within the field of materials • Project management • Project administration & project application

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Industry sector: Oil and Gas; On- & Offshore Wind

Industry role: Standardisation

Profile: Danish Standards is Denmark's national standardisation organisation. Through our Danish committees and strong professional networks, we provide knowledge about and influence on international standards to Danish enterprises, trade associations, consumer organisations, the authorities, reseachers etc. We are members of the international standardisation organisations ISO and IEC as well as the European counterparts CEN, CENELEC and ETSI.