

NFAIC High Precision Transmission Co.

Designing the optimum wind turbine driveline



“We feel honoured to support NFAIC in a series of gearbox and driveline developments for wind turbine applications. The long-term collaboration and partnership has proven Romax are a dedicated partner who strive to achieve technological advancement for their customers and a highly reliable driveline for the wind industry.”

Bingbing Zhang,

Deputy General Manager, Romax China

Fast technology transfer to innovate a new wind turbine driveline design

Before collaboration with Romax, NFAIC High Precision Transmission Co., Ltd. had little experience in medium-speed compact driveline development for the wind turbine industry.

To quickly gain market share and step into supplying large wind turbine businesses, NFAIC would need to develop a highly integrated driveline with a compact layout and high power density.

Romax worked closely with NFAIC to develop a product through concept design, detailed design, manufacturing support, assembly support and testing verification. After successfully testing the gearbox, Romax also organized technology transfer sessions to train NFAIC's engineering team and improve their in-house capability.

Client

NFAIC High PRECISION Transmission CO., Ltd is focused on wind turbine gearbox development, manufacturing and maintenance, with the objective to become a major wind gearbox supplier in China.

Challenge

To develop a competitive gearbox for its customer, a world top 5 wind turbine OEM. The very compact driveline layout and structure combined with an extremely high-power density target requires profound industry experience and advanced analytical methods to improve driveline robustness.

Solution

With experience from 36+ wind gearbox development projects Romax have developed a complete gearbox design for NFAIC within 6 months.

Benefits

NFAIC have successfully delivered the driveline to the customer on time and have quickly gained market share. The driveline has been successfully operating in the field. Romax have also provided engineering expertise to support NFAIC in developing their own technical capacity.

Product platform development

The project initially set out to design a 3MW onshore driveline. After successful commissioning in field, NFAIC and Romax managed to scale up the driveline design for large wind turbines and reduce the cost of power from 3MW to 10MW, which would be significant for future offshore wind turbines.

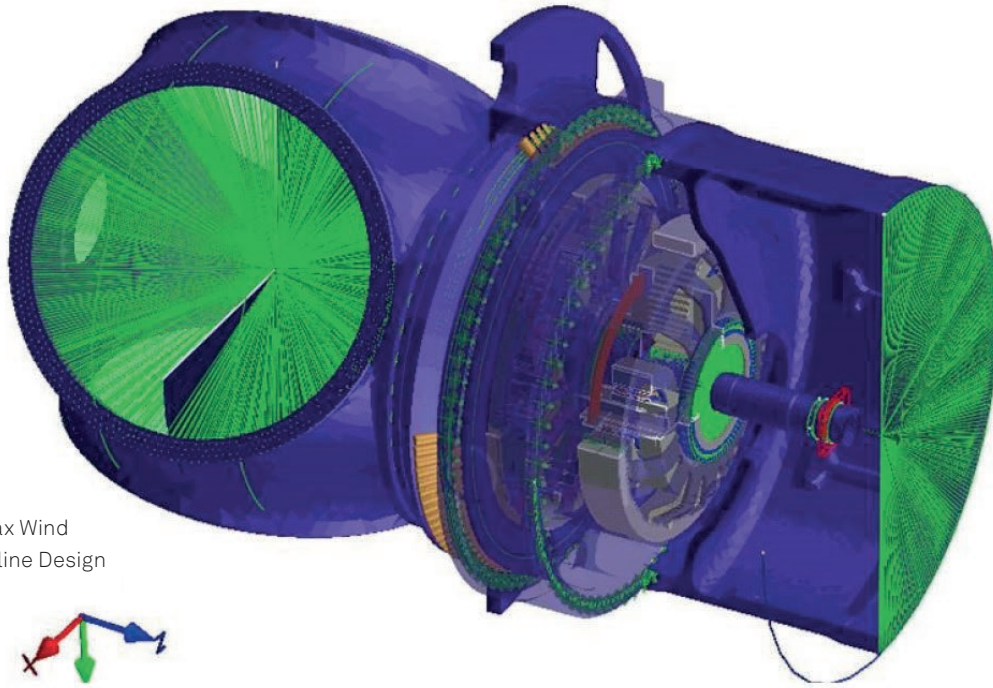
High reliability gearbox

In the development of the NFAIC 3MW driveline, achieving reliability was a challenge considering the compact layout and power density requirements. Romax carried out hundreds of analysis iterations using Romax Wind, FE methods and other tools during the development process to investigate the best trade-off of durability, efficiency and vibration performance.

To avoid oil leakage in positive lubrication system of the driveline, Romax designed a bespoke sealing structure which will enable the second-stage planetary to collect enough oil without leakage so as to ensure the lubrication and cooling performance of the gear mesh and bearing support.

Romax Wind was specifically created to enable analysis, optimization and certification of wind turbine drivelines. The simulation considers the interactions between all driveline components, with the aim of delivering Right First Time designs to minimize expensive prototype failures, either when beginning a design, or when required to redesign an existing gearbox that has not performed to expected standards.

Extensive in-housing testing was carried out in NFAIC's factory to verify the gearbox reliability and performance. The testing result proved that the driveline development was successful with load sharing factor 14.8% lower than industry regulation, vibration level across the whole driveline 28.7% lower than regulation and good contact pattern results due to Romax Wind advanced micro-geometry modification capabilities.



Romax Wind
Driveline Design



We are happy to have worked with Romax these past few years, not only do they bring advanced development techniques for wind turbine drivelines but also a rapid response and excellent service. Romax is a company with boundless technology and know-how on transmission design, manufacturing and testing verification. With their support, we have managed to develop several world-leading wind turbine drivelines and we are determined to continuously invest in the wind business to drive green energy forward, thus improving the environment for the country.”

Jinku Li,
Deputy General Manager, NFAIC



Hexagon is a global leader in sensor, software and autonomous solutions. We are putting data to work to boost efficiency, productivity, and quality across industrial, manufacturing, infrastructure, safety, and mobility applications.

Our technologies are shaping urban and production ecosystems to become increasingly connected and autonomous – ensuring a scalable, sustainable future.

Romax, part of Hexagon's Manufacturing Intelligence division, provides world-leading solutions for the design, analysis, testing and manufacture of gearboxes, drivetrains and bearings. Learn more at romaxtech.com. Hexagon's Manufacturing Intelligence division provides solutions that utilise data from design and engineering, production and metrology to make manufacturing smarter.

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