August 29, 2025

Successful 1/3 Scale Model Demonstration Testing of Offshore Integrated Wind Turbine Installation Technology:
Advancing Development of Integrated Wind Turbine Installation Technology to Minimize Costs

Toda Corporation (Head Office: Chuo-ku, Tokyo; President: Otani Seisuke) is pleased to announce that it has carried out 1/3 scale model demonstration testing as part of its development of integrated wind turbine installation technology to minimize costs, and that it has successfully completed Japan's first integrated wind turbine installation using a large floating crane.

Offshore wind power generation is considered to be key to making renewable energy a main power source. Further development of cost-lowering technologies is expected to bring floating offshore wind power generation up to the point where it can be commercialized at internationally competitive costs.

Toda Corporation was selected by the New Energy and Industrial Technology Development Organization (NEDO)[*1] for the "development of next-generation technologies to promote the introduction of floating offshore wind power generation." The integrated installation demonstration testing of large wind turbines (15 MW class: diameter of approximately 240 m) at 1/3 scale (2 MW-class wind turbine: diameter of approximately 80 m) has been taking place off the coast of Kabashima, Goto City, Nagasaki Prefecture, where it was opened to the public on August 25. The success of this demonstration testing verifies the ability to conduct integrated wind turbine installation, completely preassembled with the tower, nacelle, and blades, using large floating cranes (3,700-ton lifting class) operating domestically in Japan, and represents significant progress towards the development and practical application of integrated large wind turbine installation technology.

*1: Toda Corporation Press Release
Selected for NEDO's "Development of Next-Generation Technology to Promote the Introduction of Floating Offshore Wind Power Generation"
https://www.toda.co.jp/news/2023/20231205_003291.html

Photograph 1: During the 1/3 scale model public demonstration testing

1. Background to the Development

In order to expand floating offshore wind power generation introduction, it is essential to reduce combined total costs of floating structure manufacturing costs and construction costs. The hybrid spar-type floating structure that Toda Corporation is developing has a simple structure, making manufacturing straightforward and low-cost. This will allow us to realize mass production of floating structures through collaboration with local companies. However, one of the challenges that arose was the tendency for work time to become prolonged since wind turbines need to be assembled offshore where operational rates are lower than onshore. As a solution to this challenge and a way to minimize construction costs, Toda Corporation has been developing its “integrated wind turbine installation technology” as a method that reduces the number of offshore construction work days.

2. Overview of the Technology

The integrated wind turbine installation technology first preassembles the tower, nacelle, and blades either onshore or on a salvage barge. Next, the completed wind turbine assembly is lifted by a large floating crane (3,700-ton lifting class) that is operating and available for use domestically in Japan. Finally, the wind turbine assembly is towed to the floating structure and installed. The large floating crane raises the tower by the connecting component of the lower end, holds the tower with a fall-prevention frame, and suspends it between two crane jibs. This allows the technology to fully leverage the lifting capacity of the floating crane without being limited by the size of the wind turbine.

Through the end of the last fiscal year, Toda Corporation has been confirming, as a part of its in-house business, the construction feasibility of a 15 MW-class wind turbine by carrying out a water tank 1/100 scale model experiment while conducting simulation verifications. In addition, the 1/3 scale model demonstration testing verified that this technology can be applied to actual construction without issue.

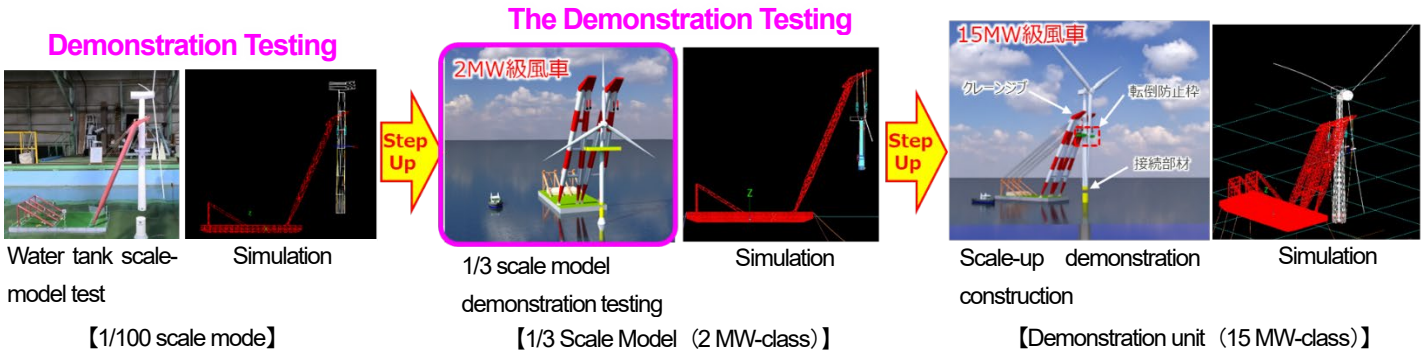

Figure 1: Development process (progressing towards enlargement)

3. 1/3 Scale Model Public Demonstration Testing

During the public demonstration testing, a 2 MW-class wind turbine was preassembled as a 1/3 scale model of a large 15 MW-class wind turbine. Following the actual procedures to be used for large wind turbines using the same class of large floating crane, the preassembled model was then raised and installed to a floating structure. Furthermore, by comparing the results of the demonstration testing with the analysis results of the simulation software being developed in parallel, we confirmed that simulations can be conducted with high precision.

The public demonstration testing was held on August 25 off the coast of Kabashima in Goto City, Nagasaki Prefecture, and was viewed by more than 30 people, including those from relevant organizations, experts, and news media-related personnel.

4. Future Prospects

Moving forward, based on the work procedures, materials, and equipment verified through the 1/3 scale model demonstration testing, we will be advancing the technology to the next steps towards conducting demonstration construction of a 15 MW-class wind turbine. In addition, by carrying out a comparison verification of the measurements

obtained from the 1/3 scale model demonstration testing and other additional testing with the analysis results of the simulation software, we aim to achieve further accuracy improvements for use in the demonstration construction of a 15 MW-class wind turbine.

Eventually, we will establish integrated wind turbine technology as well as simulation software that can be applied to wind turbines of 15 MW class and higher so that we can enable the enlargement and mass production of floating offshore wind power generation to reduce construction costs and minimize overall costs.

The Company will optimize its management resources to promote revenue growth and improve capital efficiency, aiming to enhance corporate value while achieving its medium- to long-term target of 10% ROE.

Build the Culture.
Creation from ideas, rooted in passion