

## Yamaguchi Prefectural Industrial Technology Institute



Ube, Yamaguchi Prefecture

# THK's Technology Aids Local Manufacturing Growth



Yamaguchi Prefectural Industrial Technology Institute  
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### The "Made in Yamaguchi" small wind turbine

The Yamaguchi Prefectural Industrial Technology Institute is a core technology support center for companies in our prefecture, providing engineering support and conducting R&D. In our longstanding efforts to promote the use of renewable energy, we focused on creating a vertical-axis wind turbine with a comparatively simple blade shape and whose orientation does not need to change with the direction of the wind. We selected the optimal blade by installing various types of blades and conducting wind-tunnel tests, and we developed a controller that enables peak operation from the wind turbine. In order to develop a "Made in Yamaguchi" small wind turbine by utilizing our research and the manufacturing capabilities of companies in Yamaguchi, we moved forward with a working group of five local companies that had the expertise required to develop a wind turbine. After attending a presentation on special bearings for wind turbines held at a wind power symposium, we exchanged information with THK, which has a plant in Yamaguchi, on several occasions. We asked THK to participate in the working group, and they graciously agreed.

For this project, THK proposed using a vertically split bearing shaft that would eliminate the center shaft to



Improved small wind turbine on the institute's grounds

improve air flow around the center of the vertical-axis wind turbine. Once we began actual tests of our completed wind turbine, we encountered several issues, such as the blade's arms lacking sufficient strength and the controller malfunctioning. We continued to make improvements and try again. Among the malfunctions, there was an issue where the lack of a center shaft caused the blades to deform from the centrifugal force as they rotated, and the upper bearing was damaged because the arms were repeatedly moving up and down. When we explained the situation to THK, they immediately rushed over to the turbine's location and proposed several alternative solutions in no time. To prevent the arms from moving up and down, which was our biggest problem, we ultimately decided to go with the proposal that involved using a slender shaft at the center, and THK remade the Model WLS Low-Torque Shaft Unit for us.

### Working toward commercialization

At present, we are working on solving the issue with the controller. Once that is resolved, it will mark the completion of this original, locally created wind turbine. The rated output of our current prototype is 1 kW, but we want to use the data we have collected to develop and commercialize a wind turbine capable of 5 to 10 kW. From providing engineering guidance to coming on-site the moment there was an issue, THK has been actively involved and generously cooperated with our efforts to enhance the technological capabilities of local companies, and we are sincerely grateful. Furthermore, as a wind turbine developer, it is greatly encouraging to see a company actively working to use their technology in turbines. With THK's development of a brand-new low-torque shaft unit designed for vertical wind-axis turbines, as well as their other efforts, I believe THK will have an important role to play in the renewable energy field, which must continue progressing to prevent global warming.