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## British designers put the wind up the competition

**R**enewable Energy Systems (RES), a member of the Robert McAlpine Group, has installed one of the most modern and powerful wind turbines ever produced in Britain at a site in County Antrim, Northern Ireland. This UK designed and developed 1MW class turbine will generate clean, sustainable power for approximately 625 homes.

The turbine forms part of the British engineering community's drive to exploit its wind energy, taking advantage of the UK's position as the windiest country in Europe. The project raised many design issues for the designers, such as minimising the time to market and keeping the weight of the system to a minimum. RES Ltd, who were responsible for the loading and control system, awarded the design and manufacturing contract to the Machtech division of Peter Brotherhood Ltd who in turn engaged the services of design consultants Bennetts of Rotherham to carry out the structural and mechanical design.

According to Richard Burgess, Project Manager at Bennetts, the biggest challenge was the fact that no physical prototypes could be built for a project of this magnitude, it was a one shot design that had to be right first time and had to last for at least 20 years.

Burgess says 'One of the most critical components on any wind turbine is the hub casting, where the wind forces harnessed by the blades are manipulated into the torque required for power generation. The principle purpose of the design is to hold the blades in place. As the turbine is pitch regulated however, space must also be made for actuation equipment, associated control and maintenance access.'

Bennetts used Ansys' Multiphysics package to perform finite element analysis (FEA) in order to examine both the static stresses and fatigue life of the hub under the simulated loading.

