WindSTAR
Wind-Energy Science, Technology, and Research Industry/University Cooperative Research Center

Wind Turbine Foundation Monitoring Sensor Development

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Wind turbine foundations are exposed to a combination of loading which can cause movement and eventually failure. Maintenance inspections are periodically conducted to prevent failure but are generally inconsistent and expensive. A low cost (less than $10) displacement indicator is required. The objective of this indicator is to reveal the displacement between the concrete and tower. Continuing off of a design provided from a previous capstone group, the knowledge gained through research was used to optimize this design while accounting for the design specifications. Two different variations of this product were created; one with an adjustable stopper and one with an adjustable CAM. With minimal changes to the overall functionality of the displacement indicator, prototyping was the next step towards selecting the final design. Instillation time, cost, visibility of product and functionality were all analyzed to optimize its purpose and account for any errors and malfunctions. The final indicator is designed with injection molding in mind and is successful in providing a positive indication that a movement in excess of the specification [0.040" (+/- 0.010")] has occurred.

Printed Prototypes for Two Designs of the Wind Turbine Foundation Monitoring Sensor.