

CX-100 Manufacturing Final Project Report

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Abstract

This report details the work completed under the CX-100 blade manufacturing project. It presents the tooling design and manufacturing, blade production, blade instrumentation, blade shipping and adapter plate design and fabrication. The CX-100 blade was designed to demonstrate the efficient use of carbon fiber in the spar cap of a wind turbine blade. The baseline blade used for this project was the ERS-100 (Revision D) wind turbine blade. ERS-100 master plugs – for both the high pressure and low pressure skins – were modified to create plugs for the CX-100. Using the new CX-100 master skin plugs, high pressure and low pressure molds were fabricated. Similar modifications were also completed on the shear web plug/mold, the blade assembly fixture and the root stud insertion fixture. Once all of the tooling modifications were complete, a production run of seven CX-100 prototype blades was undertaken. Of those seven blades, four were instrumented with strain gauges before final assembly. After production at the TPI facility in Rhode Island, the blades were shipped to various test sites: two blades to the NWTC at NREL, two blades to Sandia National Laboratory and three blades to the USDA-ARS turbine field test facility located in Bushland, Texas. An adapter plate was designed to allow the CX-100 blades to be installed on existing Micon 65/13M turbines at the USDA site. The conclusion of this program is the kick-off of the blade testing at the three testing facilities.