

ASSEMBLY AND CONNECTION SYSTEM FOR STRUCTURAL REUSE OF WIND TURBINE BLADES

The transition from fossil fuel to sustainable energy sources like wind energy is needed to stop the emission of CO₂ and to minimise global warming. Although green solutions are becoming more common, the transition also has a downside; material waste. Wind turbine blades have a lifecycle of 20-25 years before they are decommissioned. Their material, including Glass Fibre Reinforced Plastics, has little to no recycle options and are doomed to be burned or even used as landfill and their material characteristics and value are completely lost.

Since the blade material is still strong and light weight, a lot of value could be preserved when the material is given a second life. By using parts of the blade as a building material, the material integrity is maintained and the need to introduce other raw material into the construction of building could be avoided.

In my graduation project, I propose a system that translates a 3D-model of a blade to panels that can be used to construct a geodesic dome. The dome is scalable to any desired dimension or frequency through the same system. To make it possible to assemble a dome with curved panels, a set of 3 plate connectors with ball-socket joints are designed. The system, connectors and dome are tested and proved on desirability, feasibility and viability.

