Design and Testing of a Floating Archimedes' Screw Turbine

Bird Rivera, Paul (School: Centro Residencial de Oportunidades Educativas de Ceiba)

The Archimedes screw is one of the most recent editions in the wave of renewable energy. The obstacles posed by a regions geography for the construction of industrial plants and the devastation produced by large-scale dams have a big impact on the production of these systems. The Archimedes screw offers an alternative solution for dense, protected areas with the ability to use low-head production. Manufacturing the system is remarkably simple, but the screw itself presents some challenges for large-scale production. The use of a digital design and 3D printing was used to make a floating prototype, an ideal system for this type of application. Due to the unpredictability of the tropical climate and its river systems, an AI simulation was made which proved that the system could work. Field tests were carried out in both the Upstream and the backwash. In the Upstream we obtained an average RPM of 155rpm over 4 test un-anchored and an average 220rpm while anchored. Back wash results where vastly different due to the turbulence for an average of 205rpm un-anchored and 160rpm while anchored. Conversion from flow to rotation was achieved, therefore it is possible to produce electricity.

Awards Won: