



SENIOR DESIGN ORGANIZATION SYNOPSIS – Spring 2014

BICYCLE POWERED WATER FILTRATION SYSTEM

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Water is the most essential part of human life, yet one in eight people in the world don't have access to safe and clean drinking water. Water-related disease is to blame for one out of every five deaths of children under the age of five. In many impoverished areas, people walk many miles to reach a source of water that isn't necessarily potable. Not only is distance an issue, but the average water collecting container in Africa, the jerry can, weighs over 40 pounds when full. This project's main goal is to attack all these problems and improve the quality of life of people within these conditions.

This bicycle-powered water filtration system is a two part project in which a bicycle prototype is built to increase accessibility to clean water through filtering and transportation. Due to this process, a means of sanitation is created to supply clean water for a variety of family needs such as drinking, cooking, and washing. The pump is powered by the kinetic energy supplied to the pedal, and is used to pull unclean water out of one holding tank, pass through a filtration system, and onward into a clean tank. The two major considerations when building this prototype is the overall system cost and durability. Given that the bicycle must target a demographic that includes some of the poorest regions in the world, reliability is one of the primary factors incorporated into the design. The functionality of the pump and filter system need to be researched extensively, so as to provide a product that requires as little maintenance as possible. Assuming that all users have no experience with any vehicle of this type is also an appropriate mindset to take. Developing the most practical device possible will help to limit the probability of user error that could end in dire consequences.

The second part of the project involves taking the pump and filtration system and making them their own isolated device. The goal is to be able to retro-fit this network onto any pre-existing bicycle. This would bring production costs down exponentially, as well as increase distribution to a much larger demographic. Amount of water transportation per trip is another area of general concern. Some examples of prototype bicycles are able to carry up to twenty liters for each filling, but we believe that it is possible to carry more. Collaborating with various successful non-profit organizations such as The Water Project, Water.org, and Charity Water

could allow the continuous growth of this product and further aid in the objective to provide clean water to the rest of the world.