Miscanthus Cutting and Conditioning Devices

Overview

Miscanthus is a biomass energy crop that is gaining popularity among alternative energy crops to help decrease dependence on petroleum based energy sources. Although there are many uses for miscanthus, the technologies used to harvest and process the crop are still not perfected. This project examines the current methods used to harvest the crop so that efficiency can be increased and the barrier to entry for farmers to begin growing miscanthus can be decreased.

Objectives

This project developed two stand-alone devices to simulate cutting and conditioning the crop that can be utilized in a laboratory setting to collect data that explains how and why the crop behaves the way it does and how to design machinery that a farmer can use to efficiently harvest the crop in the field.

Approach

- Began by gathering background information from our sponsor about current harvesting methods and problems that need to be addressed
- Travelled to the field to see current product issues and gather crop for testing
- Investigated current products, patents and crop properties
- Developed concepts to improve harvesting efficiency
- Weighted concepts to choose designs to take to the prototype phase
- Selected a conditioning and cutting device design and developed Solidworks Models
- Developed manufacturing plan
- Obtained materials and built both devices
- Tested prototypes by using crop to simulate field conditions

Outcomes

- Applied the practical engineering concepts that were learned throughout our college career to a real life problem
- The ability to take a project through the phases of concept generation, design, manufacturing and testing has been a very valuable experience
- Two lab test devices were designed, built and tested
- The devices built will be very helpful in advancing the technology used in biomass harvesting