Helping Guatemalan farmers

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Four ME seniors complete humanitarian engineering project

Four MSU College of Engineering students took a farm implement used to separate the head of a stalk of grain from the rest of the plant, souped it up and shipped it to Guatemala where it will be put to good use.

The hand-built thresher, designed as part of Brian Thompson’s Humanitarian Engineering ME 491 class, headed to Guatemala on Sunday, Nov. 9.

The four mechanical engineering seniors are:

Joe Aljajawi from Troy;
Tyler Jezowski from Linwood;
Adam Kluz of Wixom; and
Adam Lyman from DeWitt.

Aljajawi offered an overview on the project.

“Malnutrition and economic hardship of smallholding farmers in Guatemala is motivation for producing a pigeon pea thresher,” he said. “The team’s mission is to develop, design, and manufacture a low cost, post-harvest threshing machine for pigeon pea farmers in Guatemala that can be manufactured at local facilities.”

Jezowski said it was kind of funny how it all started. “You see all of the same faces when you go from class to class but until you’re faced with a humanitarian project, especially one of this magnitude, you never really mesh with people this way,” he explained. “Once the class started, once the project was assigned, faces turned into friends and ideas changed into something that could shape the world in a good way, all because of one professor who planted a seed.”

Lyman noted that creating a simple machine, such as a bicycle thresher, was anything but simple. “By analyzing our design, we were able to determine what could be synthesized and streamlined,” he said. “In addition, all parts had to be robustly designed for intense use, to match the nature of agricultural work.”

Kluz said a lot of research and testing went into ensuring the machine’s proper operation. “A variety of products were tested with several different operators on multiple iterations of the thresher,” he explained. “Such things as gearing ratios, pulley orientation, and product clearances were tested. These tests led to many design improvements, which both enhanced the thresher but at the same time simplified its design.”

Kluz also said that ideas such as replacing a machined pulley with a bike rim both increased the ease of operation and also made fabrication less time consuming. “The design really came down to making the simplest machine that still maintained all the technical aspects that we had established. While this can be stressful, its also something as engineers that we often enjoy,” he added.

The mechanical engineers gave the thresher a final test run Nov. 5 before sending it off to its Central American destination.

The thresher works on pedal power to process pigeon peas. It is part of a larger humanitarian project to encourage farmers in the world’s fourth most malnourished country to expand into a new ag market.
Once delivered, the thresher will be used to harvest pigeon peas, a legume that is a common food grain throughout Central America.

The MSU-designed equipment will lower harvesting time in Guatemala from 32 hours to 1.7 hours per 500 pounds of pigeon peas.

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