

Wire Winding Machine

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Abstract

Delta Heat LLC, located in Rio Hondo, TX, is a manufacturer of heating products for viscosity control and freeze protection who has contacted the University of Texas Pan American during the summer of 2011 for design and prototyping of a wire winding machine. The company stated that they were interested in the development of a machine that could produce resistive wire with a fiberglass core. The product (resistance wire) is currently used within their flexible rubber heaters product line which is available for purchase in the market. However, they face the problem of having to buy resistance wire in bulk and shipping is also a major issue due to time constraints on the orders placed. Delta Heat LLC currently buys material in bulk sizes and is constantly left with a surplus of raw material and therefore loses money. Based on these customer requirements two wire winding machines were built to produce custom resistive wires on fiberglass core minute and add a catch spool mechanism to the machine.

Project

This project was divided into two phases, a design phase and a prototyping phase. The design phase included problem formulation, conceptual design, and final design analysis methodology. Research was conducted to begin drafting an initial design of the wire winding machine. However, it was noted that the information about the machines was limited due to the fact that these machines are usually trade secrets. The team took a different approach and researched similar production methods and based on these methods developed a final design. The design phase was effectively completed on December 2012 and prototyping began in January 2012. The prototyping phase included prototyping, calibrating, and redesign of machine. It was agreed that two identical machines were to be constructed with one to be delivered to the company in May 2012. The second machine is to stay at The University of Texas-Pan American where further research will be conducted to improve both its production and quality control aspects as well as implement automation.

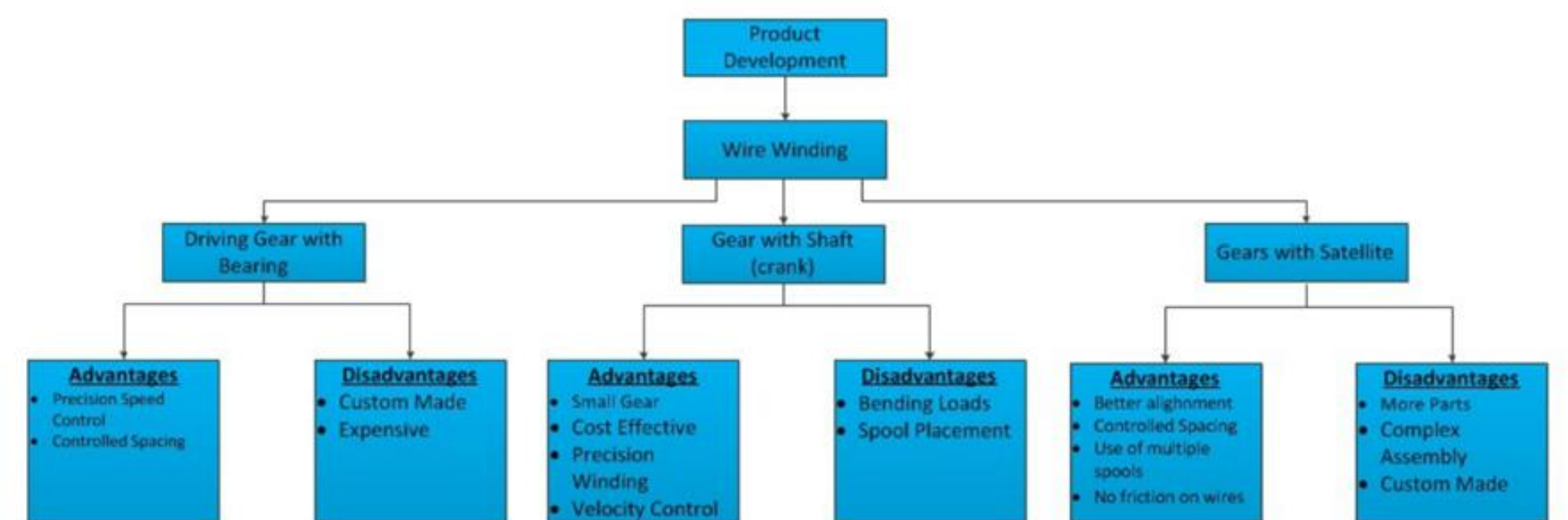
Goals:

Develop a automated machine that is ready for production for Delta Heat, LLC.

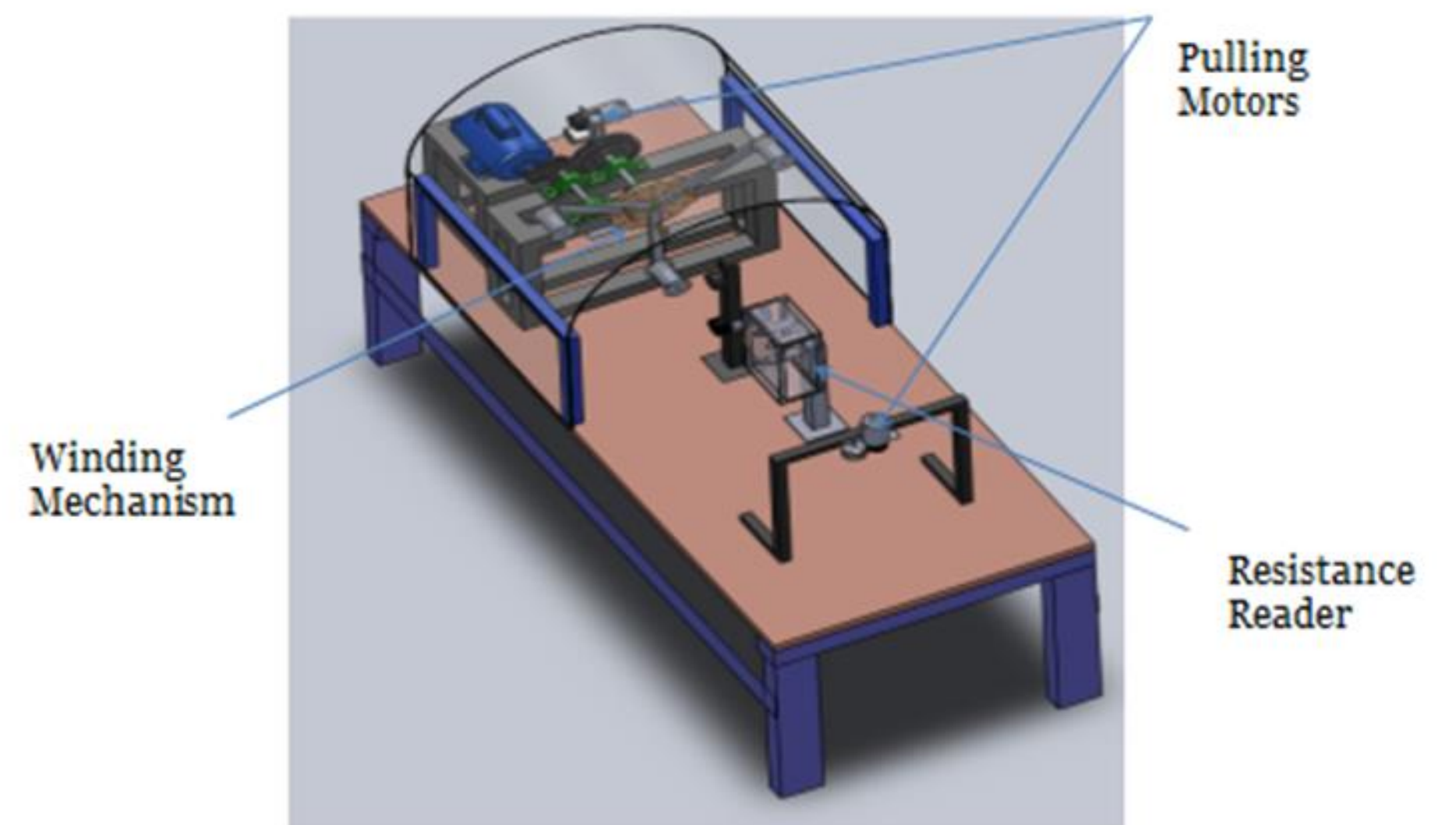
Overview:

Based on the specification of the customer we built and delivered the machine to Delta Heat. The machine has been running in production mode for more than the year generating revenue for the customer. More features for the machine are being considered for further improvement.

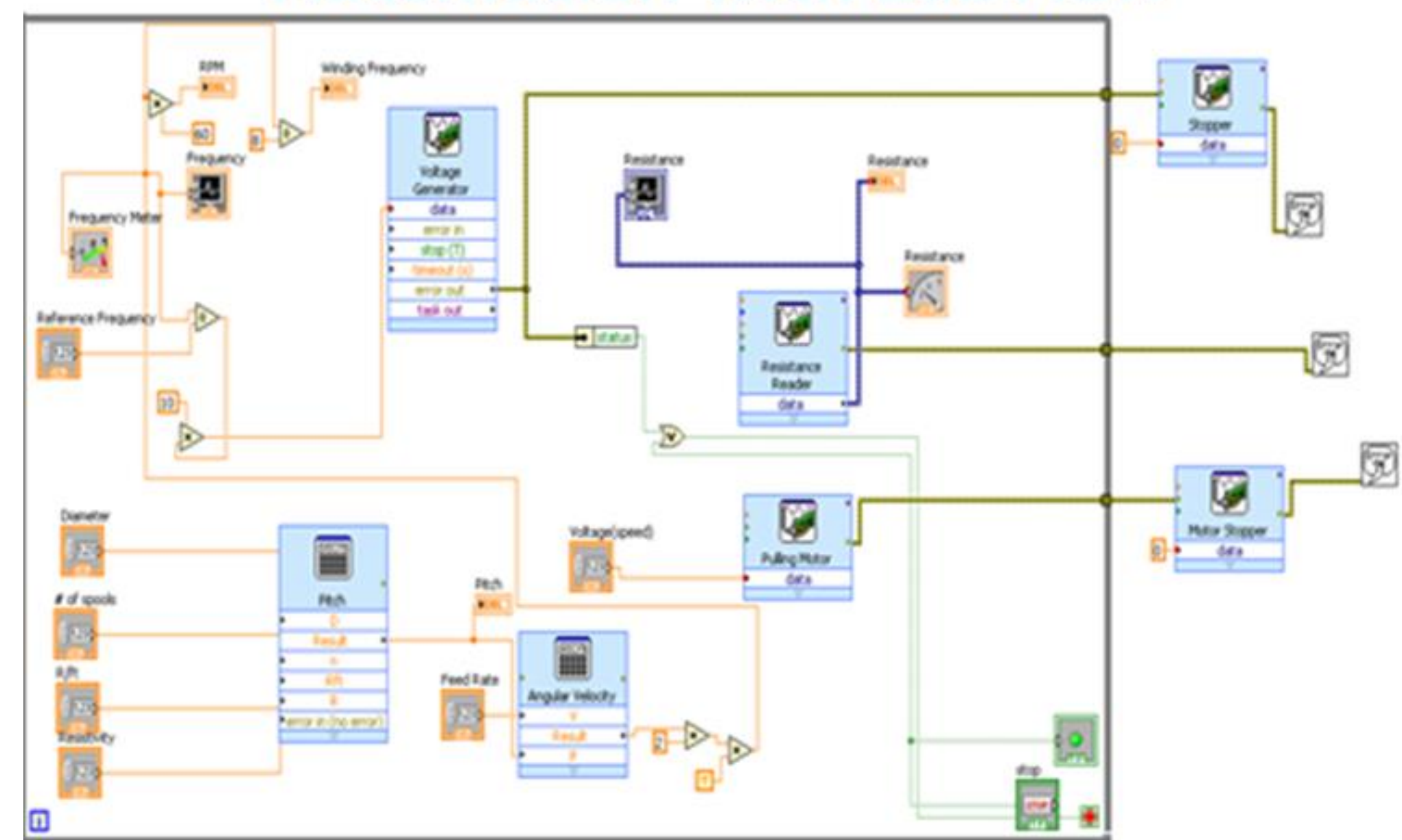
Product Design



Final Product



Automation with LabView



Selected References:

- <http://deltaheatllc.com/>
- <http://www.mcmaster.com/#standard-mounted-ball-bearings/=kes1r3>
- <http://www.ingersollrandproducts.com/am-en/products/lifting/winches/winch-selection-support/the-importance-of-fleet-angle>