Aerial Saw Improvements

Overview
Haverfield Aviation uses an aerial saw suspended from a helicopter to trim tree branches growing near power lines. Their current saw weighs approximately 900 pounds. Reducing the weight of the saw can directly translate into higher productivity and efficiency in the system.

Objectives
The goal of the project is to reduce the weight of the saw by 200 pounds while keeping it simple to build and serviceable in the field.

Approach
- The team visited Haverfield Aviation and interviewed mechanics and pilots of the saw to determine customer needs and target specifications.
- Current products and patents were studied to see other designs of aerial tree trimming equipment.
- Results of our external search were discussed with the sponsor who was had personal experience with some of the researched designs.
- Constructed a 3D model of the existing saw in Solidworks to establish a base weight and strength.
- Changes materials and design to save weight without sacrificing strength.
- Analyzed all redesigned parts with Solidworks Simulation to determine if part can survive in service.
- Made a CAD model of new saw design and rendered in Solidworks.
- Fabricated a 2 blade long prototype of saw tube and spindles to prove redesign of drive system.

Outcomes
- The sponsor will have a 36% increase in revenue due to the weight savings.
- 200 pounds was removed from the saw.
- The saw is still able to be built in house and serviced by Haverfield.
- The new design is equally as strong as the old saw.