Articulating Leg Design

Overview
This project was created to control the variability and increase the distance of a return for soccer without changing the efficiency of the net’s ability to return a golf ball. The intended design was to create an articulating leg or hinge to be integrated into the lower portion of the frame in order to achieve the desired improvements.

Objectives
The objective was to increase the net’s ability to return a soccer ball through improving both the distance returned and the repeatability of the return through minor modifications to the original design, while keeping the production costs at a minimum. It is desired for the entire framing system to be made entirely of aluminum tubing, but eliminating as many of the welds as to reduce production costs.

Approach
- Gathered customer needs and requirements via teleconference
- Reviewed relevant patents and analysed existing competition
- Generated design concepts from brainstorming and looking at other products with hinge designs
- Modelled designs in SolidWorks
- Performed force and stress analysis on weakest point to determine best prototype
- Fabricated best prototype using custom and pre-made parts from McMastercarr
- Made modification to reduce the “smile”
- Performed testing. Gathered kick speed and ball return distance with and without smile modification
- Statistically analysed kick speed and return distance
- The 70-degree angle with smile modification produced the largest increase

Outcomes
- The 70-degree angle with smile modification produced a 70% increase in ball return distance
- The 60-degree angle can be used for follow-up or rebound training
- Completely eliminated the need for welds