Security Tag for Eyeglasses

Overview
The purpose of this project is to design a new security tag for eyeglass products that is more practical and functional than current designs. The tag should be able to attach to a wide range of glasses, while still protecting the glasses and not getting in the way of potential customers from trying the glasses on. The design should keep the production and manufacturing costs low without jeopardizing its durability.

Objectives
- Design must be adjustable to ensure the product is attachable to a wide range of eyeglass products
- Tag housing must be made from a low cost, yet durable plastic like ABS.
- Pre-defined EAS marker must fit inside design
- Locking components must be made from magnetic steel to be removed by magnetic detacher
- Locking mechanism must resist a 55 lb. pull force
- Design should be optimized around mass production of 5 million parts per year.

Approach
- Attended teleconference with Tyco’s contact and other team members to develop initial specifications and customer needs.
- Gathered customer needs using Tyco’s given requirements, by asking retail stores what they preferred, and determining what customers liked and disliked about trying on glasses with tags
- Generated target specifications according to list of customer needs
- Performed external research including existing products and patent research
- Performed concept generation individually and again after initial feedback from team and sponsor
- Concept selection was verified through Pugh matrix using top 4 designs.
- Primary design was modelled using SolidWorks and detailed Finite Element Analysis was performed on locking mechanism
- Developed initial prototypes to begin further analysis and determine strengths and weaknesses of design
- Continued iterative process of making more prototypes between testing of each design
- Tensile tested primary design to meet engineering specification of required pull force
- Final design was tested on numerous in-store glasses to determine security and fitness rate

Outcomes
- New design is 6 to 10% cheaper than previous model
- Security rate increased by 35%
- Fits 64% more glasses
- Final prototypes were functional and were secure on variety of glasses
- Further investigation into appearance of tag might be necessary