Tyco Footwear Tag Project

Overview
This project is commissioned by Tyco, a global business that designs and manufactures security tag and strips. The project is done in collaboration with teams of students from Pennsylvania State University and Shanghai Jiao Tong University. The goal of this project is to redesign Tyco’s existing high heel security tag for flat bottom shoes. This includes sneakers, flats, men's business shoes, etc.

Objectives
Our objective was to design a security tag that could attach to flat bottom shoes without affecting the comfortability and visual appeal of the shoe or damaging the shoe in any way. To accomplish this, we attached the security tag to the back of the shoe and secured it with wires wrapping around the shoe.

Approach
Our group took the following approach to solving the problem proposed:

- **Defining the problem:** This was completed by reviewing the needs of Tyco. In order to get a better understanding of the needs of the customers, online surveys and in-person interviews were performed.
- **Brainstorming:** Each team member generated multiple idea that had the potential to solve the problem at hand. These ideas were then exchanged in order to help generate more creative ideas. During this time, relevant patents were reviewed in order to get a better understanding of what technology and products are already out on the market.
- **Concept Selection:** After generating ideas, the final idea was selected. This was done through the use of a screening matrix and a Pugh Selection Matrix.
- **Prototyping:** Once the final idea was selected, CAD models were created in SolidWorks. This allowed us to get a better idea what the design looks like, and quickly make necessary changes. This model was then 3D printed in order to further investigate the design, and find potential problems associated with the assembly or functionality of the footwear tag.
- **Analysis:** Finite Element Analysis was performed on key structural components. Thus, our team was able to confirm that the design could withstand potential forms of tampering.
- **Testing:** Testing was performed to ensure the security tag met the project requirements of: not affecting the shoe’s comfortability or visual appeal, able to be detached with the Tyco MKD 31 detacher, and ensuring the shoe cannot be stolen.

Outcomes
The outcome for this project is that Tyco will have a working security tag for flat footwear. This can be marketed alongside their already successful security tag for high-heeled shoes. This will bring in more business and greater success for Tyco.