The One-Handed Zip Tie

Overview
The problem presented by our sponsor was the standard zip tie. A standard tie has two major flaws; it requires two hands for proper use, and the tail can be inserted backward into the head. The challenge facing the team was to reinvent the zip tie by designing and producing a one-handed irreversible tie, while also facing time and money constraints.

Objectives
- Design an innovative one-handed, irreversible zip tie
- Produce as many zip ties at the end of the semester as possible
- End the project with a successful report and presentation that will benefit the sponsor
- Finish the project within the allotted time and do not go over budget

Approach
- Held initial group meeting to discuss course goals and personal skills and weaknesses
- Identified the problem and potential customers
- Surveyed current zip tie users for customer needs and requirements
- Began writing the course report
- Brainstormed ideas for a solution using at least three methods
- Performed a patent search and benchmarking
- Created at least ten rough alpha prototypes and presented them to the sponsor
- Narrowed ideas down to three and combined them to create a beta prototype
- Continued editing the course report
- Drew CAD models
- Performed tensile testing and FEA analysis
- Got approval from sponsor to order rapid prototypes of beta design
- Chose a final design and performed final testing
- Created a final report, poster, and presentation
- Ordered as many final prototypes as possible with remaining budget
- Confirmed sponsor satisfaction

Outcomes
- The sponsor must continue to invest in the manufacturing of this product to eventually gain a profit on sales.
- The project is a more convenient and useful zip tie than what is currently on the market.