Design of a Competitive Air Maintenance Device - Global

Overview
Tyco Fire Protection Products produces an air maintenance device (AMD-1) for dry pipe sprinkler systems. They are losing business because their current AMD-1 is too long from inlet to outlet. A global team of four Penn State University Students and two Shanghai Jiao Tong University students were tasked with redesigning Tyco’s old AMD-1 to be more competitive in today’s market.

Objectives
The main goals of this redesign project are to:
- Shorten the overall length of the AMD-1
- Reduce the cost of the AMD-1
- Simplify the AMD-1 assembly process

Approach
- Coordinated meeting times with international team members, professors and Tyco sponsors
- Gathered data and needs from Tyco sponsors
- Examined competing products and established team goals to be competitive with these products
- Generated multiple concepts of new designs and chose three best
- Developed SolidWorks models of all three concepts
- Evaluated each concept based on customer needs and selected one final design
- Created an alpha prototype of new AMD-1 from ordered parts
- Tested for assembly times of both new and old AMD-1
- Restructured the design during testing to new beta prototype which was even shorter and cheaper than the alpha prototype
- Retested for assembly times with new beta prototype

Outcomes
The team successfully built a working prototype of the new AMD-1 and succeeded in meeting all of Tyco’s objectives:
- The new AMD-1 is 30% shorter in overall length
- The new AMD-1 has a component cost 10% less than the original
- The new AMD-1 can be assembled 30% more quickly than the original
- There are fewer unique parts on the new AMD-1 and only one custom built part