Versatile Device for Filtering “Equal” in Commercial Truck Tires

Overview
IMI presented the problem of filtering their dynamic tire balancer EQUAL in commercial truck tires with short or bent valve stems. Their current solution is only applicable to long valve stems therefore they needed a method of filtering EQUAL that can be used on all valve stems. Short and bent valve stems are primarily used in European industries and IMI wants to expand their market to these areas and therefore needs a method of filtering applicable to these areas.

Objectives
The team’s objective was to increase IMI’s marketing range. They need a product that can be used on many types of valve stems and effectively filters EQUAL such that it doesn’t clog the valve core. The team wanted to build an attachment IMI can supply to their customers to filter EQUAL with many valve stem geometries.

Approach
- Visited sponsor for a greater understanding of the problem
- Acquired various valve stems to analyze different geometries
- Suggested potential needs and allowed customer to weigh and rank them
- Identified patents and other possible solutions currently on the market that could be implemented
- Developed potential solutions based on customer needs and ideas from external search
- Used a selection matrix to decide on a primary and secondary design
- Created CAD models to convey the initial design and feasibility
- Developed various rapid prototype models
- Created beta type and tested design
- Revised design based on tests and produced final prototype
- Performed final testing to assure design met customer needs

Outcomes
- The sponsor now has another option for filtering EQUAL in short or bend valve stems
- Project suggested a new method for filtering EQUAL
- Created a potential fast and inexpensive method option to be used on short and bend valve stems
- The project allowed IMI to avoid any aesthetic displeasures and kept external length constant
- No manipulation of the valve core was necessary