HOSE REEL REDESIGN

**Introduction**
HydraMaster is a carpet cleaning supply company that specializes in carpet cleaning machines and truck mounts. Along with these main products, they also sell several accessories including vacuum and solution hose reels. The vacuum hose reels that HydraMaster currently sells have several problems, and they have asked our team to redesign their hose reels in order to fix those problems. The main problems with the current reels are

- they have many parts and take a long time to assemble
- they must be shipped assembled which increases the shipping cost
- they must be stored assembled which increases used inventory space
- they are easily damaged during shipping
- their powder coating flakes off over time and allows the steel to rust

Some other problems with the hose reels are that many different models must be made and kept in stock to meet all the needs. There are two different size hose reels, each with several storage capacity options, a live connection option, and a power rewind option. The motor used for the power rewind option also adds several hundred dollars to the hose reel price.

**Initial Concepts**
Our primary goals for this project, based on the problems that we were given to solve, have been

- to reduce the hose reel part count
- to reduce the assembly time
- to allow the hose reels to be shipped disassembled
- to reduce the number of models and still meet all the size and capacity requirements
- to improve corrosion resistance

With these goals in mind, our team came up with several ideas for the new hose reels. We considered using bent bars, molded plastic or sheet metal sides, and one piece core sections to reduce the number of parts and assembly time. We considered standard bolts or snap together parts so that the hose reels could be shipped disassembled and put together by the end user. We considered materials such as plastic, aluminum, and stainless steel to prevent corrosion. We also considered telescoping or segmented core sections so that a single reel could meet several capacity requirements.

**Final Design**
Our final design took parts and components from several of our initial design concepts and meets all of the design requirements. We chose to make the reel from polyethylene and the stand from aluminum because these are both corrosion resistant materials. We chose polyethylene for the reel because it is light-weight, and although it has a high upfront cost for molds, it has a low part cost. It also reduces the number of parts and allows the parts to be made so they snap together. We chose aluminum for the base because it is inexpensive, and the base will not be required to sustain large loads.

Our final design has a telescoping core so that the user can adjust the hose reel for the required capacity. It is also designed to allow a live connection, and the motor is designed as an add-on. These three features mean that only two different hose reel models and the motors must be kept in stock. We also chose to use a spring motor as a hose rewind assist, which reduced the motor cost.