

When choosing a topic for our project we had to **brainstorm** many ideas. For each idea it was critical to define the "need" associated with that idea. The topic we chose to focus on for this project is a mechanically powered vacuum cleaner. The idea originated from Rich Vo's design of a device that transferred vertical rotation into high speed horizontal rotation. In essence the Mechanically Powered Vacuum Cleaner that we have designed puts Rich's idea into application.

This outline will summarize the intended sections of our final report on this design. These **sections** include Why we chose to design a vacuum, What the mechanical vacuum is, How we designed the mechanical vacuum, and Improvements that we made throughout the design process. Interestingly, in the early stages of our project a great deal of consideration went into what our machine was actually going to do. We considered dusting and polishing, before we decided that the machine would act like a vacuum.

Another part of our project will be our collaborative design efforts using **Solidworks**. One of our goals is to create an exact model of our final product using assembly. This allows each member of our team to create individual 3d parts and connect them all together in one file. We realized early on that it would be vital for us to all use the same software version so that we could make changes to each others work.

Furthermore, it is our intent to create a **mechanical analysis** of the parts. This section would analysis what external forces each part will be subject to. This would demonstrate the reason for some of our design features, and show which parts may be designed for easy maintenance or replacement.

In addition to the 3D modeling of our design we plan to put a great deal of consideration into **materials** for our project. The finished product will have an estimated 20 separate parts, but they will not all be the same material. For example, the wheels should be a type of rubber that has a balance between hardness, traction and cost. Another example is the handle which might be a plastic that has a good balance of hardness, cost and weight. There may even be metallic components in our design. All of this will be covered in our final paper, including our rational for all of these decisions.

Another section that we may add to our report is the **manufacturing** process for our product. This would detail the instructions of how to fabricate our product. By considering how our project will be fabricated we can improve our design by streamlining parts, and simplifying components.

Finally, our paper may include a **specifications** section. This section would outline the abilities and limitations of our product. Also, the estimated weight, size and capacity. Some limitations may be particle size and weight that can be vacuumed using our product. For example the distance between fan blades may limit the particle size that can be vacuumed.