A Novel Technique for Creating Complex Shapes for Engineering Prototypes

Katy Riojas
Mentor: Dr. John Henshaw,
Department Chair and Harry H. Rogers Professor of Mechanical Engineering
Department of Mechanical Engineering, The University of Tulsa , Stephenson Hall, 800 S. Tucker Dr., Tulsa, OK 74104

Introduction

The first generation Magic Rider prototype is a mobility platform for children ages 2-6 who are disabled.

The platform allows children to power their own movement whereas they otherwise could not

The platform teaches children depth perception and spatial awareness, as well as helping instill a sense of self-esteem and self-worth.

The challenge for the Summer of 2013 was to improve the existing Magic Rider prototype by creating a new body using a novel design and construction technique.

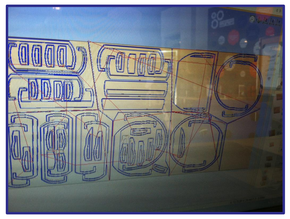
•The new body of the Magic Rider was to be more functional and aesthetically pleasing

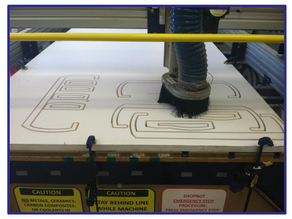
Results

Materials and Methods

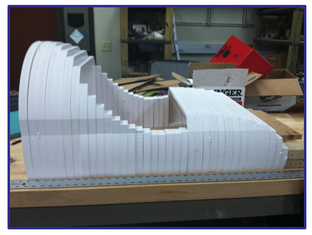
Materials:
1.1" Foam PVC sheet [48"X 96"]
2.Computerized Drilling Router
3.PVC Cement
4.Bondo
5.Paint

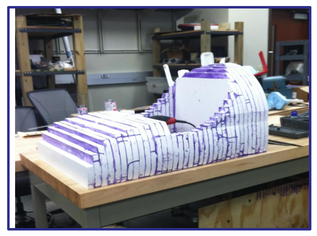
Method:
1.Computerized Drilling Router to cut out 1" cross sections of PVC



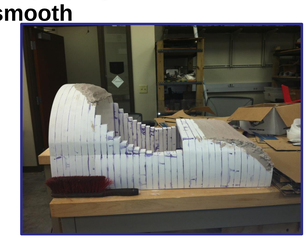


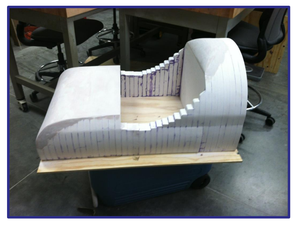
2. Attaching cross sections with PVC adhesive





3. Applying Bondo to create a streamlined curve and sanding smooth





4. Constructing a base and painting

Conclusions

1. The novel technique developed for this work to create the body allows for the accurate production of complex shapes for use in engineered prototypes

Future Directions

1. Fabricating the cross-sections from a different material, such as plywood would be suggested to decrease the weight of the overall prototype
2. Utilizing the ribbed cross-section technique to create a mold for the production of multiple prototypes would be suggested to decrease time and cost of construction, as well as weight

Applications

- The body production method utilized for this project can be applied to building a variety of engineering prototypes, both mechanical and non-mechanical.
- This method allows for more complex shape design, reducing limitations on the creativity of engineers when building prototypes to solve problems

Acknowledgements

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2. STEM-UP
3. Tulsa Undergraduate Research Challenge
4. OK=LSAMP