Steering Mechanism for Eclectic Vehicle (EV)

Team: Jodie and Abilio, Design 2, BEengTech Project 2020. Lectured by Adam Liberatore

Abstract

1. Constructing a Steering mechanism for Electric Vehicle (EV).
2. The objective above is achieved through design process of CAD modelling, laser and waterjet cutting, welding etc.
3. Various types of materials used. To mention some: aluminum plates, mild steel tube, wood, fiber glass and resin mix for the dashboard,.
4. The outcome is a comfortable linkage type steering.
5. Improvement on swing arm grips is required and more time for this type of project.

Introduction

This steering design is part of an electric vehicle (EV) project for Design 2 paper. This team of two is required to design and build a steering mechanism and mountings for AV and be fitted in the vehicle itself. The steering should comply with the necessary engineering standards and meet the client's requirements.

Steering mechanism is the vehicle movement control system that includes few main components which are the steering wheel, the steering column, ball joint, swing arms as shown in the figure below.

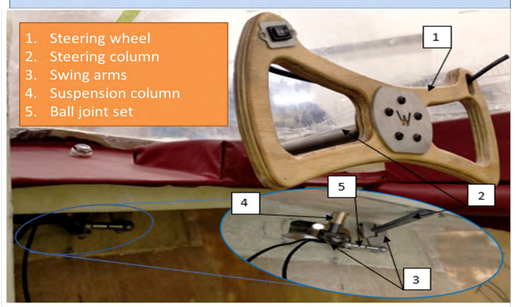


Figure 1 Steering Unit

Methods and Materials

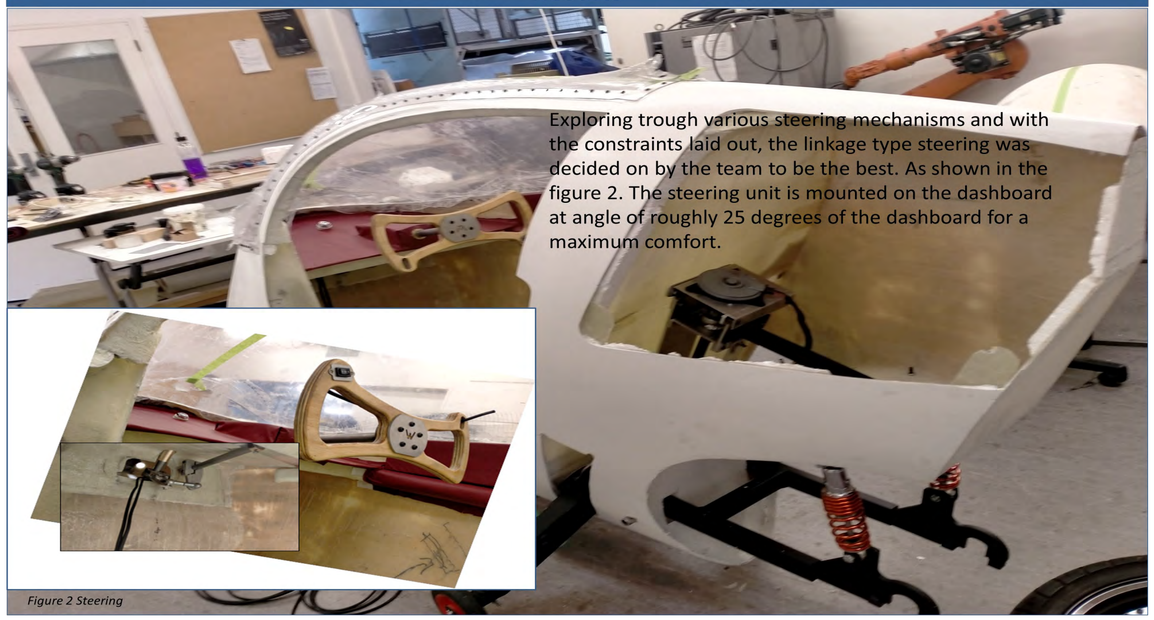
Design process.

1. Modelling on solidworks.
2. Laser cut some parts on Medium-density fiberboard (MDFs).
3. Assemble and test.
4. After testing then cut and build out of actual materials.

Materials

1. Ball joint set.
2. Wood.
3. 22mm diameter tube.
4. Aluminum.
5. Bolts and nuts.
6. Fiberglass and resin mix.

Results



Exploring trough various steering mechanisms and with the constraints laid out, the linkage type steering was decided on by the team to be the best. As shown in the figure 2. The steering unit is mounted on the dashboard at angle of roughly 25 degrees of the dashboard for a maximum comfort.

Figure 2 Steering

Conclusions

After evaluating different steering types to meet the requirements, a comfortable linkage steering mechanism is engineered to the reasonable standard for the client's satisfaction.

Future suggestions

1. If using the existing mechanism, consider spline both shafts/tubes and arms for better grips.
2. Using spring restoring on the steering.

References

How the steering system works. (2019). How a Car Works; How a Car Works. https://www.howacarworks.com/basics/how-the-steering-system-works

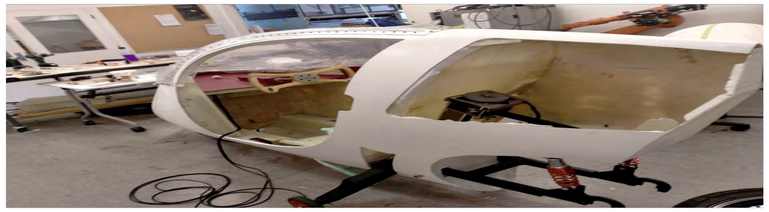
Learn Engineering. (2019). Counter Steering | The interesting physics behind it [YouTube Video]. In YouTube. https://www.youtube.com/watch?v=ZpV2Bg-WX0w

Countersteering. (2020, September 20). Wikipedia. https://en.wikipedia.org/wiki/Countersteering

https://en.wikipedia.org/wiki/Ackermann_steering_geometry

ball joint - Google Search. (n.d.). Www.Google.Co.Nz. https://www.google.co.nz/search?q=ball+joint&source=lnms&tbm=isch&sa=X&ved=2ahUKEwiEmeiMifLsAhW7zzgGHUm6CcsQ_AUoAXoECB4QAw&biw=1600&bih=789

Vehicle steering system with independent steering for each wheel. (n.d.). https://patents.google.com/patent/US5154437A/en

Acknowledgements

We would like to express our special thanks of gratitude to our lecture Adam Liberatore who gave us the opportunity to do this wonderful project on the Electric Vehicle, as well as William and Ken who also guided us for making it possible and challenged us for doing a lot of Research and we came to know about so many