

# DESIGN AND FABRICATION OF FAIL SAFE SEGWAY PERSONAL TRANSPORTER

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**Abstract:** The purpose of the paper is to design and fabricate a fail-safe Segway Personal Transporter (PT). This segway was designed to overcome the cost of the actual segway and to provide zero pollution within the campus and also this segway doesn't use the gyro unit which keeps the segway in the flat position instead this is achieved by the supporting wheels which we will be seeing in detail

**Keyword:** Zero pollution, Fail-safe, gyro unit.

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## I. INTRODUCTION

The aim of the paper is to design and fabricate the fail-safe segway personal transporter the gyro unit in the segway help it to stand flat from the ground which avoids the tilts when the segway is in motion and in our design we have added supporting wheels which does not allow the segway to topple while in motion because if the gyro unit fails or if the segway is bent beyond a point there is a chance of fatal accidents hence we have come up with this design and taking the cost into account the original segway cost around 3laks plus tax where as the fail-safe segway cost around 10,000 since it has a minimal of components which in no way hinders the functioning of the same

## II. FRAME

The frame is the most important part of the segway it is designed in such a way that the segway wheels are guarded from the obstacles and has a platform for the driver the detail view of the segway frame is shown in Fig 1 and 2



Fig1: Frame of the fail-safe segway personal transporter



Fig2: Frame and supporting wheels of the fail-safe segway personal transporter

### III. HUB MOTOR

The fail safe segway uses the internal hub electric motor which is used in the electric scooter and the throttle is given using the accelerator this motor has a specification of 48v and runs at a top speed of 60 kmph as shown in Fig3



Fig3: The In-hub motor of the electric scooter

### IV. BRAKING SYSTEM

The fail-safe segway uses the brakes for turning left and right that is if the segway needs to turn left the left side brake is applied and the segway turns left and the accordingly for right since the in hub motor comes with an braking system it is easy to assembly the system the braking system.

## V. POWER SOURCE

The power for the segway is given by 4 batteries each of the specification of 12v and 40 amps/hr Final assemblies Fig5



Fig4: This is the battery pack of the fail-safe segway personal transporter

## VI. CONCLUSION

This design and fabrication paper on fail-safe segway personal transporter is aimed at providing a zero pollution environment within the campus and cut short on the costs of the actual segway this also provides solution for making the segway topple safe this paper has wide scope for research in the braking and supporting systems. We have reduced the cost from three lakhs to ten thousand but with little more updating the segway can be turned into a full fledged personal transportation with an cost of twenty five thousand Cad model.

## VII. FABRICATED MODEL OF SEGWAY



Fig5: The fully fabricated fail-safe segway personal transporter

## VIII. DESIGN AND CAD MODEL

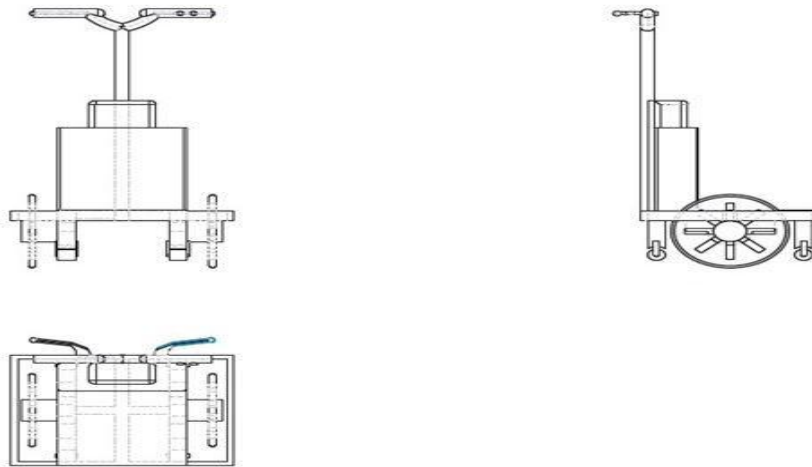


Fig6: 2D model of the fail-safe segway personal transporter

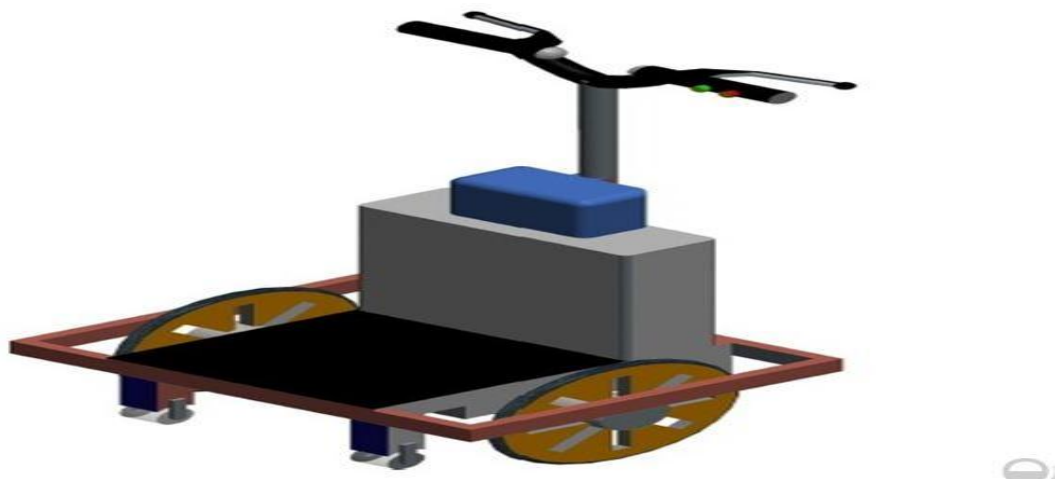


Fig7: CAD model of the fail-safe segway personal transporter

## REFERENCES

- [1] "Segway Inc. Introduces 2005 Product Line with More Power, More Attitude and More Options," Segway Inc., Bedford, NH. (2005). Obtained from: [http://www.segway.com/about-segway/media-center/press\\_releases/pr\\_030105c.php](http://www.segway.com/about-segway/media-center/press_releases/pr_030105c.php). Site last accessed April 13, 2009.
- [2] Segway Laws, Governors Highway Safety Association, Washington, DC. (2008). Obtained from: [http://www.ghsa.org/html/stateinfo/laws/segway\\_laws.html](http://www.ghsa.org/html/stateinfo/laws/segway_laws.html). Site last accessed.
- [3] Consumer Products Safety Commission. "Segway Inc. Announces a Recall to Repair Segway Personal Transporters," Consumer Products Safety Commission. (2006). Obtained from: <http://www.cpsc.gov/cpscpub/prerel/prhtml06/06258.html>. Site last accessed April 13, 2009.
- [4] Liu, R. and Parthasarathy, R. "Segway Human Transporter (HT): Potential Opportunities and Challenges for Transportation Systems," Presented at the 82nd Annual Meeting of the Transportation Research Board, Washington, DC. (2003).
- [5] Litman, T. and Blair, R. "Managing Personal Mobility Devices (PMDs) in Nonmotorized Facilities," Presented at the 83rd Annual Meeting of the Transportation Research Board, Washington, DC. (2004).

- [6] Shaheen, S.A. and Finson, R. "Bridging the Last Mile: A Study of the Behavioral, Institutional, and Economic Potential of the Segway Human Transporter," Presented at the 82nd Annual Meeting of the Transportation Research Board, Washington, DC. (2003).
- [7] Rodier, C., Shaheen, S.A., and Chung, S. "Unsafe At Any Speed?: What the Literature Says About Low-Speed Modes," Presented at the 83rd Annual Meeting of the Transportation Research Board, Washington, DC. (2004).
- [8] Landis, B.W., Petritsch, T.A., and Huang, H.F. Characteristics of Emerging Trail Users and Their Safety, FHWA-HRT-04-103, Federal Highway Administration, U.S. Department of Transportation, Washington, DC. (2004).
- [9] Landis, B.W., Petritsch, T.A., Huang, H.F., and Do, A. "Characteristics of Emerging Trail Users and Their Safety," Presented at the 83rd Annual Meeting of the Transportation Research Board, Washington, DC. (2004).
- [10] Segway Group. Washington, DC. Obtained from: <http://groups.yahoo.com/group/dc-Segways/>. Site last accessed March 3, 2004.
- [11] United States Access Board. ADA Accessibility Guidelines for Buildings and Facilities (ADAAG), Washington, DC. (2004). Obtained from <http://www.access-board.gov/adaag/html/adaag.htm>. Site last accessed April 13, 2009.
- [12] American Association of State Highway and Transportation Officials. A Policy on Geometric Design of Highways and Streets, 5th ed., Washington, DC. (2004).
- [13] American Association of State Highway and Transportation Officials. Guide for the Planning, Design, and Operation of Pedestrian Facilities, Washington, DC. (2004).