Design of Electric Car Using Solar Energy

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***Abstract*—This thesis presents the design and assembly of an electric car that utilizes solar energy. The author, Vũ Văn Tiệp, designed and assembled the structural components, including the power transmission system, steering system, suspension system, braking system, lighting system, and electrical system. The author also simulated the solar-powered electric car on a computer. The design process involved selecting appropriate components such as the battery, solar panel, and motor. The author acknowledges the limitations in the computational and selection methods due to the constraints of time and knowledge level. The work provides a detailed analysis of the design and simulation process, highlighting the challenges faced in the implementation of the project.**

***Index Terms*—electric car, solar energy, power transmission, steering system, suspension system, braking system**

I. Introduction

The thesis begins with an overview of electric cars, distinguishing between solar-powered electric cars and fuel-efficient vehicles. It discusses the global and local development of electric cars, focusing on the design requirements, battery, solar panel, and motor selection. The author, Vũ Văn Tiệp, selected the design requirements for the electric car, considering the practical constraints of time and knowledge. The introduction sets the stage for the detailed design and simulation process that follows [1]. Published books on the methods and subject of this project provide context for this English summary [5]. Published articles on the methods and subject of this project provide context for this English summary [6]. Published articles on the methods and subject of this project provide context for this English summary [7], [8], [9].

II. Methods

The author designed and assembled the structural components of the electric car, including the power transmission system, steering system, suspension system, braking system, lighting system, and electrical system. The thesis also includes the simulation of a solar-powered electric car on a computer. The author used computational tools to model the car's performance and to select appropriate components. The design process involved selecting the battery, solar panel, and motor, and the author provided detailed diagrams and calculations for each system. The limitations in the computational methods and selection processes are acknowledged due to the constraints of time and knowledge [1].

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III. Results

The author designed and assembled the structural components of the electric car, including the power transmission system, steering system, suspension system, braking system, lighting system, and electrical system. The thesis also includes the simulation of a solar-powered electric car on a computer. The author used computational tools to model the car's performance and to select appropriate components. The design process involved selecting the battery, solar panel, and motor, and the author provided detailed diagrams and calculations for each system. The limitations in the computational methods and selection processes are acknowledged due to the constraints of time and knowledge [1].

IV. Discussion

Despite the author's efforts to research and apply knowledge from books and practical experience, the thesis acknowledges the limitations in the computational and selection methods due to the constraints of time and knowledge level. The author suggests developing the topic into a group project and creating a physical model to improve the accuracy of the data and enhance the practical knowledge of mechanical, electrical, and electronic systems for students in the field of electrical and electronic automotive engineering. The discussion highlights the need for further research and practical implementation to overcome the limitations identified in the design process [1].

V. Conclusion

The author successfully designed and assembled the structural components of the electric car, including the power transmission system, steering system, suspension system, braking system, lighting system, and electrical system. The thesis also includes the simulation of a solar-powered electric car on a computer. However, the author acknowledges the limitations in the computational and selection methods due to the constraints of time and knowledge level. The work provides a detailed analysis of the design and simulation process, highlighting the challenges faced in the implementation of the project [1].

References

[1] Vũ Văn Tiệp, "Design of Electric Car Using Solar Energy," internal undergraduate thesis (original in Vietnamese), Thai Nguyen University of Information and Communication Technology, 2021.
[2] Đỗ Văn Dũng (2007), Trang bị điện & điện tử trên ô tô hiện đại, NXB Đại học Sư phạm kỹ thuật TPHCM
[3] Lê Văn Tụy (2011), Bài giảng môn học Ô tô hybrid, NXB Đại học Bách khoa Đà Nẵng

[4] Bài giảng Sức Bền Vật Liệu 2http://www.hdu.edu.vn/NewsImages/file/Khoa%20Ky%20Thuat%20Cong%20nghe/Tai%20lieu%20giao%20trinh/BAI%20GIANG%20SBVL2.pdf
[5] Hee-Je Kim, ”Solar Power and Energy Storage Systems,” Jenny Stanford Publishing, 2019. ISBN 9780429458774. DOI: 10.1201/9780429458774.
[6] K. Sasaki, M. Yokota, H. Nagayoshi, K. Kamisako, ”Evaluation of electric motor and gasoline engine hybrid car using solar cells,” Solar Energy Materials and Solar Cells, vol. 47, no. 1-4, pp. 259-263, 1997. DOI: 10.1016/s0927-0248(97)00047-0.
[7] Mehmet Sait Cengiz, Mehmet Salih Mamiş, ”Use of Solar Energy in Electric Vehicles,” International Journal of Engineering Technologies, IJET, vol. 1, no. 4, pp. 123, 2015. DOI: 10.19072/ijet.90265.
[8] Louiza Sellami, Ebert S, ”Design and Implementation of a Solar Power Augmented Electric Car,” Journal of Electrical Engineering and Electronic Technology, vol. 04, no. 02, 2015. DOI: 10.4172/2325-9833.1000116.
[9] Hideki Kimura, ”Utilization Technology of Solar Energy and Development of Solar Car,” Seikei-Kakou, vol. 23, no. 10, pp. 589-592, 2011. DOI: 10.4325/seikeikakou.23.589.