

# Regenerative Braking System for Electric Vehicles

**Prof. R. K. Nanwatkar<sup>1</sup>, Mr. Krushna Mane<sup>2</sup>, Mr. Mahesh More<sup>3</sup>, Mr. Ajinkya Jagadale<sup>4</sup>, Mr. Vyankatesh Joshi<sup>5</sup>**

Assistant Professor, Mechanical Engineering, NBNSSOE, Pune, India<sup>1</sup>

UG Student, Mechanical Engineering, NBNSSOE, Pune, India<sup>2,3,4,5</sup>

**Abstract:** In this project we are using this regenerative braking concept to apply brakes to vehicle and creating electrical energy simultaneously by using alternator. Regenerative braking is an energy recovery mechanism that slows a vehicle or object by converting its kinetic energy into a form that can be either used immediately or stored until needed. In the project we are applying this concept to one wheel which is rotating. Its mechanical rotary energy is converted into the electrical energy. This electrical energy can be stored and utilized in critical situations or to run the internal components present in the car. To develop and design this project we are using CATIA V5 CAD software.

**Keywords:** Energy, Stored, CATIA V5 CAD, etc.

## REFERENCES

- [1] Ravikant K. Nanwatkar, Dr. Deepak S. Watvisave, "Analysis and Simulation of Hybrid Energy Storage System for Electric Vehicle" in July 2021| IJIRT | Volume 8 Issue 2 | ISSN: 2349-6002.
- [2] Chengqun Qiu, Guolin Wang, Mingyu Meng, Yujie Shen. "A novel control strategy of regenerative braking system for electric vehicles under safety critical driving situations" Volume 149, 15 April 2018, Pages 329-340 <https://doi.org/10.1016/j.energy.2018.02.046>
- [3] Jiejunyi Liang, Paul D. Walker, Jiageng Ruan, Haitao Yang, Jinglai Wu, Nong Zhang.
- [4] "Gearshift and brake distribution control for regenerative braking in electric vehicles with dual clutch transmission" Vol. 133, March 2019, Pages 1-22 <https://doi.org/10.1016/j.mechmachtheory.2018.08.013>
- [5] Bla z Luin, Stojan Petelin, Fouad Al-Mansour. "Microsimulation of electric vehicle energy consumption" Volume 174, 1 May 2019, Pages 24-32 <https://doi.org/10.1016/j.energy.2019.02.034>
- [6] A. Joseph Godfrey, V. Sankaranarayanan "A new electric braking system with energy regeneration for a BLDC motor driven electric vehicle", Aug. 2018, <https://doi.org/10.1016/j.jestch.2018.05.003>
- [7] Chang Han Bae "A simulation study of installation locations and capacity of regenerative absorption inverters in DC 1500 V electric railways system" 10.1016/j.simpat.2009.02.003
- [8] P. Suresh Kumar, Swapnil Joshi, N. Prasanthi Kumari, Sathyajit Nair, Suman Chatterjee "Modification of Existing Regenerative Braking System for Electric Vehicle" <https://www.ijitee.org/wp-content/uploads/papers/v8i11/K15120981119.pdf>
- [9] [https://energyeducation.ca/encyclopedia/Regenerative braking#cite\\_note-book\\_1-6](https://energyeducation.ca/encyclopedia/Regenerative_braking#cite_note-book_1-6) [2]
- [10] <https://news.cision.com/market-engineering/r/flywheel-hybrids>
- [11] <https://www.autosport.com/fl/news/69199/kers-failure-caused-red-bull-fire-scare>
- [12] <https://www.autosport.com/fl/news/69391/bmw-mechanic-escapes-kers-scare>
- [13] [http://news.bbc.co.uk/sport2/hi/motorsport/formula\\_one/8229449.stm](http://news.bbc.co.uk/sport2/hi/motorsport/formula_one/8229449.stm)
- [14] <https://www.greencarcongress.com/2008/11/bosch-developin.html>
- [15] <https://web.archive.org/web/20090113183348/http://www.racecarengineering.com/news/people/273697/peugeot-reveal-hybrid-racer-for-2009.html>
- [16] <https://www.popsci.com/article/cars/car-runs-air/>

- [17] <https://web.archive.org/web/20080922221623/>
- [18] <http://www.racecarengineering.com/news/people/274178/mclaren-on-track-with-kers.html>
- [19] <https://web.archive.org/web/20080922221623/http://www.racecarengineering.com/news/people/274178/mclaren-on-track-with-kers.html>
- [20] <https://www.greencarcongress.com/2007/07/toyota-hybrid-r.html>
- [21] <https://web.archive.org/web/20090113183348/http://www.racecarengineering.com/news/people/273697/peugeot-reveal-hybrid-racer-for-2009.html>
- [22] [www.epa.gov/otaq/technology/research/research-hhb.htm](http://www.epa.gov/otaq/technology/research/research-hhb.htm)
- [23] [https://www.greencarreports.com/news/1089510\\_electric-car-trivia-when-was-regenerative-braking-first-used](https://www.greencarreports.com/news/1089510_electric-car-trivia-when-was-regenerative-braking-first-used)
- [24] <https://greeninginc.com/blog/new-tech/where-are-regenerative-brakes-headed/>
- [25] <https://insideevs.com/reviews/342108/best-and-worst-electric-cars-for-regenerative-braking/>
- [26] Sayed Nashit, Sufiyan Adhikari, Shaikh Farhan, Srivastava Avinash and Amruta Gambhire, 'Design, Fabrication and Testing of Regenerative Braking Test Rig for BLDC Motor', 2016.
- [27] Tushar L. Patil, Rohit S. Yadav, Abhishek D. Mandhare, Mahesh Saggam, Ankul
- [28] Pratap, 'Performance Improvement of Regenerative braking system ', International
- [29] C. Jagadeesh Vikram, D. Mohan Kumar, Dr. P. Naveen Chandra, 'Fabrication of Regenerative Braking System', International Journal of Pure and Applied Mathematics Volume 119, (2018).
- [30] A. Eswaran, S Ajith, V Karthikeyan, P Kavin, S Loganandh, 'Design and Fabrication of Regenerative Braking System', International Journal of Advance Research and Innovative Ideas in Education-Vol-4 Issue-3 (2018).
- [31] Ketan Warake, Dr. S. R. Bhahulikar, Dr. N. V. Satpute, 'Design & Development of Regenerative Braking System at Rear Axle', International Journal of Advanced Mechanical Engineering. Volume 8, Number 2 (2018).
- [32] Siddharth K Sheladia, Karan K Patel, Vraj D Savalia, Rutvik G Savaliya, 'A Review on Regenerative Braking Methodology in Electric Vehicle', International Journal of
- [33] Creative Research Thoughts, Volume 6, Issue I (2018).
- [34] <https://www.theweldingmaster.com>
- [35] Ehsani Mehrdad, Gao Yimin, Emadi Ali, Modern Electric, Hybrid Electric and Fuel Cell Vehicles, CRC Press, 2010.
- [36] Gao, Dr. Yimin, "Regenerative Braking," Encyclopedia of Sustainability Science and Technology, 2012.