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(71)Name of Applicant :

1)Mr. Balaji Krushna Potnuru

Address of Applicant :Assistant Professor Mechanical Engineering Dept. MALLA REDDY ENGINEERING COLLEGE (Autonomous) MAIN CAMPUS, Maisammaguda (H), Gundlapochampally Village, Medchal Mandal, Medchal-Malkajgiri District, 500100. Telangana balajikrushna.p@gmail.com, 9491616673 Secunderabad -----

2)Malla Reddy Engineering College

3)Mrs. Machireddy Venkata Varalakshmi

Name of Applicant : NA

Address of Applicant : NA

(72)Name of Inventor :

1)Mr. Balaji Krushna Potnuru

Address of Applicant :Assistant Professor Mechanical Engineering Dept. MALLA REDDY ENGINEERING COLLEGE (Autonomous) MAIN CAMPUS, Maisammaguda (H), Gundlapochampally Village, Medchal Mandal, Medchal-Malkajgiri District, 500100. Telangana balajikrushna.p@gmail.com, 9491616673 Secunderabad -----

2)Mrs. Machireddy Venkata Varalakshmi

Address of Applicant :Mrs. Machireddy Venkata Varalakshmi ASSOCIATE PROFESSOR Mechanical Engineering Dept., MALLA REDDY ENGINEERING COLLEGE (Autonomous) MAIN CAMPUS, Maisammaguda (H), Gundlapochampally Village, Medchal Mandal, Medchal-Malkajgiri District, 500100. Telangana machireddy2003@mrec.ac.in &9885591723 Secunderabad ----

3)Mrs. Bhanuteja Sanduru

Address of Applicant :Assistant Professor Mechanical Engineering Dept., Gokaraju Lailavathi Engineering College (GRIET Campus), Nizampet Road, Bachupally, Kukatpally - 500090. Telangana bhanusanduru@gmail.com Hyderabad -----

4)Mrs. Snehapriya Muvvala

Address of Applicant :Assistant Professor Mechanical Engineering Dept., Gokaraju Lailavathi Engineering College (GRIET Campus), Nizampet Road, Bachupally, Kukatpally - 500090. Telangana, snehapriya.glwec@gmail.com Hyderabad -----

5)Dr.G.Praveen Kumar

Address of Applicant :Dr.G.Praveen Kumar Assistant professor G Pullaiah College of Engineering and Technology Kurnool Pin code : 518002, Andhra Pradesh praveen.gandla@gmail.com Kurnool -----

(57) Abstract :

This work presents an innovative electro-mechanical system design for the actuation of automotive seating systems, addressing the growing demand for luxurious and efficient seat adjustment mechanisms. The proposed design combines a gearbox, motor, and linkage system to achieve precise seat actuation with minimal mechanical effort, reduced power consumption, and compliance with regulatory standards. Detailed design specifications, including gearbox configuration, motor parameters, and linkage mechanics, are provided. The system is modeled using Pro-E Wildfire 4.0, with critical components analyzed virtually in ANSYS 13.0 for performance evaluation. The results demonstrate the effectiveness of the design in achieving targeted motion control, load capacity, and energy efficiency.

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