# HYDRAULIC SEAT OPENER FOR SCOOTERS

**A PROJECT REPORT**

***Submitted by***


**THIYANESHWAR ASHOKA N (927621BME066)**
**VETRIVEL S (927621BME067)**
**VIMALKUMAR R (927621BME070)**


***in partial fulfillment for the award of the degree***

***of***

**BACHELOR OF ENGINEERING**

**IN**

**MECHANICAL ENGINEERING**


**M. KUMARASAMY COLLEGE OF ENGINEERING, KARUR**

**ANNAUNIVERSITY: CHENNAI 600025**


**NOVEMBER 2023**

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## BONAFIDE CERTIFICATE

Certified that this project report "**HYDRAULIC SEAT OPENER FOR SCOOTERS"** is the bonafide work of **"THIYANESHWAR ASHOKA N (927621BME066), VIMAL KUMAR R (927621BME070), VETRIVEL S (927621BME067)"** who carried out the project work during the academic year 2023 – 2024 under my supervision. Certified further, that to the best of my knowledge the work reported here in does not form part of any other project report or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

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This project report has been submitted for the end semester project viva voce Examination held on _____

INTERNAL EXAMINER EXTERNAL EXAMINER

DECLARATION

We affirm that the Project titled **"HYDRAULIC SEAT OPENER FOR SCOOTERS"** being submitted in partial fulfillment off or the End Semester Examination of **B.E. MECHANICAL ENGINEERING**, is the original work carried out by us. It has not formed the part of any other project or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

| Student Name | Signature |
|---|---|
| 1. THIYANESHWAR ASHOKA. N | ---------- |
| 2. VETRIVEL. S | ---------- |
| 3. VIMALKUMAR. R | ---------- |

Name and signature of the supervisor with date

Dr. L. EMMANUAL

ASSISTANT PROFESSOR / MECH

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Words are boundless to thank Our Parents and Friends for their constant encouragement to complete this project successfully.

## INSTITUTION VISION & MISSION

### Vision

- To emerge as a leader among the top institutions in the field of technical education.

### Mission

- Produces mart technocrats with empirical knowledge who can sur mount the global challenges.
- Create a diverse, fully-engaged, learner-centric campus environment to provide quality education to the students.
- Maintain mutually beneficial partnerships with our alumni, industry and professional associations.

## DEPARTMENT VISION, MISSION, PEO, PO & PSO

### Vision

- To create globally recognized competent Mechanical engineers to work in multi-cultural environment.

### Mission

- To impart quality education in the field of mechanical engineering and to enhance their skills, to pursue careers or enter into higher education in their area-of-interest.
- To establish a learner-centric atmosphere along with state-of-the-art research facility.
- To make collaboration with industries, distinguished research institution and to become a center of excellence

## PROGRAM EDUCATIONAL OBJECTIVES (PEOS)

The graduates of Mechanical Engineering will be able to

- PEO1: Graduates of the program will accommodate insightful information of engineering principles necessary for the applications of engineering.
- PEO2: Graduates of the program will acquire knowledge of recent trends in technology and solve problem in industry.
- PEO3: Graduates of the program will have practical experience and interpersonal skills to work both in local and international environments.
- PEO4: Graduates of the program will possess creative professionalism, understand their ethical responsibility and committed towards society.

# PROGRAM OUTCOMES

**The following are the Program Outcomes of Engineering Graduates will be able to:**

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design / Development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life - long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life -long learning in the broadest context of technological change.

## PROGRAM SPECIFIC OUTCOMES (PSOs)

**The following are the Program Specific Outcomes of Engineering Graduates:**

The students will demonstrate the abilities

1. **Real world application:** To comprehend, analyze, design and develop innovative products and provide solutions for the real-life problems.
2. **Multi-disciplinary areas:** To work collaboratively on multi-disciplinary areas and make quality projects.
3. **Research oriented innovative ideas and methods:** To adopt modern tools, mathematical, scientific and engineering fundamentals required to solve industrial and societal problems.

| **Course Outcomes** | At the end of this course, learners will be able to: | **Knowledge Level** |
|---|---|---|
| CO - 1 | Identify the issues and challenges related to industry, society and environment. | Apply |
| CO - 2 | Describe the identified problem and formulate the possible solutions. | Apply |
| CO -3 | Design / Fabricate new experimental set up/devices to provide solutions for the identified problems | Analyse |
| CO -4 | Prepare a detailed report describing the project outcome | Apply |
| CO - 5 | Communicate outcome of the project and defend by making an effective oral presentation. | Apply |

## MAPPING OF PO & PSO WITH THE PROJECT OUTCOME

| **Course Outcomes** | **Program Outcomes** | | | | | | | | | | | | **Program Specific Outcomes** | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 |
| CO - 1 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 3 | 3 | 2 | 2 | 3 | 2 | 3 |
| CO - 2 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 3 | 3 | 2 | 2 | 3 | 2 | 3 |
| CO - 3 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 3 | 3 | 2 | 2 | 3 | 2 | 3 |
| CO - 4 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 3 | 3 | 2 | 2 | 3 | 2 | 3 |
| CO - 5 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 3 | 3 | 2 | 2 | 3 | 2 | 3 |

# TABLE OF CONTENTS

# ABSTRACT

The Hydraulic Seat Opener for Scooter is a revolutionary innovation designed to enhance user convenience and accessibility. This system utilizes hydraulic technology to effortlessly lift the scooter's seat, eliminating the need for manual effort. With its user-friendly design, this invention promises to streamline daily routines for scooter riders, ensuring a hassle-free and comfortable experience. Say goodbye to strenuous seat adjustments and embrace the future of effortless scooter seat operation with the Hydraulic Seat Opener.

# CHAPTER -1

## 1. INTRODUCTION

Our Hydraulic Seat Opener for Scooter is designed to transform the way you interact with your ride. Stay tuned as we delve into the mechanics and benefits of this innovation, offering a glimpse of how it can simplify your daily scooter experience.

- ❖ Traditional scooter seat adjustments can be inconvenient and physically demanding.
- ❖ Our project addresses this issue with an innovative solution: the Hydraulic Seat Opener.

## 1.1 DESCRIPTION

The project focuses on the design, development, and implementation of a Hydraulic Seat Opener for scooters. This innovative system aims to enhance user convenience by providing a mechanism for effortless and automated opening of the scooter seat. The report covers various aspects of the project, including the motivation, objectives, methodology, and the final outcomes.

## 1.2 PROBLEM STATEMENT

The existing problem in scooter seat opening lies in the manual and sometimes cumbersome process that riders face when accessing the storage compartment under the seat. The conventional method typically involves the rider dismounting the scooter, unlocking the seat with a key.

## 1.3 OBJECTIVES

The aim and objective of this project is to encompass various aspects, aiming to address existing challenges and enhance the overall user experience.U-turn and reverse turning. This invention is mostly useful in the beginners. This involves various things like Convenience Enhancement, User Friendly Operation, Safety Integration, Energy Efficiency, Durability and Reliability, Cost Effectiveness.

# CHAPTER 2

# 2. PROJECT METHODOLOGY

## 2.1 EXISTING PROBLEM

The existing problem in scooter seat opening lies in the manual and sometimes cumbersome process that riders face when accessing the storage compartment under the seat. The conventional method typically involves the rider dismounting the scooter, unlocking the seat with a key.

## 2.2 PROPOSED SOLUTION

The proposed solution to address the existing problem of manual and cumbersome scooter seat opening is the implementation of a Hydraulic Seat Opener system. This innovative system aims to automate the process, providing a more convenient and user-friendly experience for scooter riders.

# CHAPTER 3

# CONSTRUCTION AND WORKING

## 3.1 CONSTRUCTION

The construction of the Hydraulic Seat Opener for scooters centers around the utilization of a Hydraulic Gas spring, streamlining the integration process. The project initiates with the procurement of the Hydraulic Gas spring, a key component designed to provide controlled and automated lifting of the scooter seat. Unlike more complex hydraulic systems, the gas spring simplifies the installation process, requiring minimal modifications to the scooter's structure. The gas spring is strategically placed to facilitate smooth and effortless seat movement. The control mechanism, whether it be a handlebar button or a remote control, is integrated with the gas spring to enable user-friendly operation. Safety considerations are addressed by implementing features like an emergency stop mechanism. The weather-resistant design ensures the durability of the system in various environmental conditions. Energy efficiency remains a focus, and the system is calibrated to optimize battery usage. This streamlined construction approach aims to deliver a cost-effective and user-friendly Hydraulic Seat Opener, enhancing the convenience and accessibility for scooter riders.

## 3.2 WORKING

The Hydraulic Seat Opener for scooters, employing a Hydraulic Gas spring, operates with a focus on simplicity and efficiency. The Hydraulic Gas spring, filled with compressible nitrogen, serves as the central component. Integrated strategically within the scooter's seat structure, it works by applying controlled hydraulic pressure to lift the seat automatically. A user-friendly control mechanism, whether a handlebar button or a remote control, initiates the activation process. When triggered, the Hydraulic Gas spring responds by compressing the gas inside, generating a force that extends the hydraulic rod and effortlessly lifts the scooter seat. Safety is paramount, with features like an emergency stop mechanism in place for user control. The design also considers weather resistance, safeguarding the Hydraulic Gas spring and associated components against environmental elements. Calibrated for energy efficiency, the system optimizes battery usage. Durability and reliability are key considerations, ensuring the Hydraulic Seat Opener provides a consistent and dependable solution. Ultimately, this approach delivers a streamlined and user-friendly experience, eliminating the manual effort traditionally associated with accessing the scooter's storage space.

## 3.3 ADVANTAGES AND DISADVANTAGES

| ADVANTAGES | DISADVANTAGES |
|---|---|
| • Convenience and Accessibility<br>• User-Friendly Operation<br>• Safety Features<br>• Energy Efficiency<br>• Durability and Reliablity<br>• Cost Effective | • Dependency on Hydraulic Components<br>• Potential for Weight Increase<br>• Cost of Installation<br>• Limited Retrofitting<br>• Learning Curve for Users<br>• Limited User Control<br>• Maintenance Cost |

# CHAPTER – 4

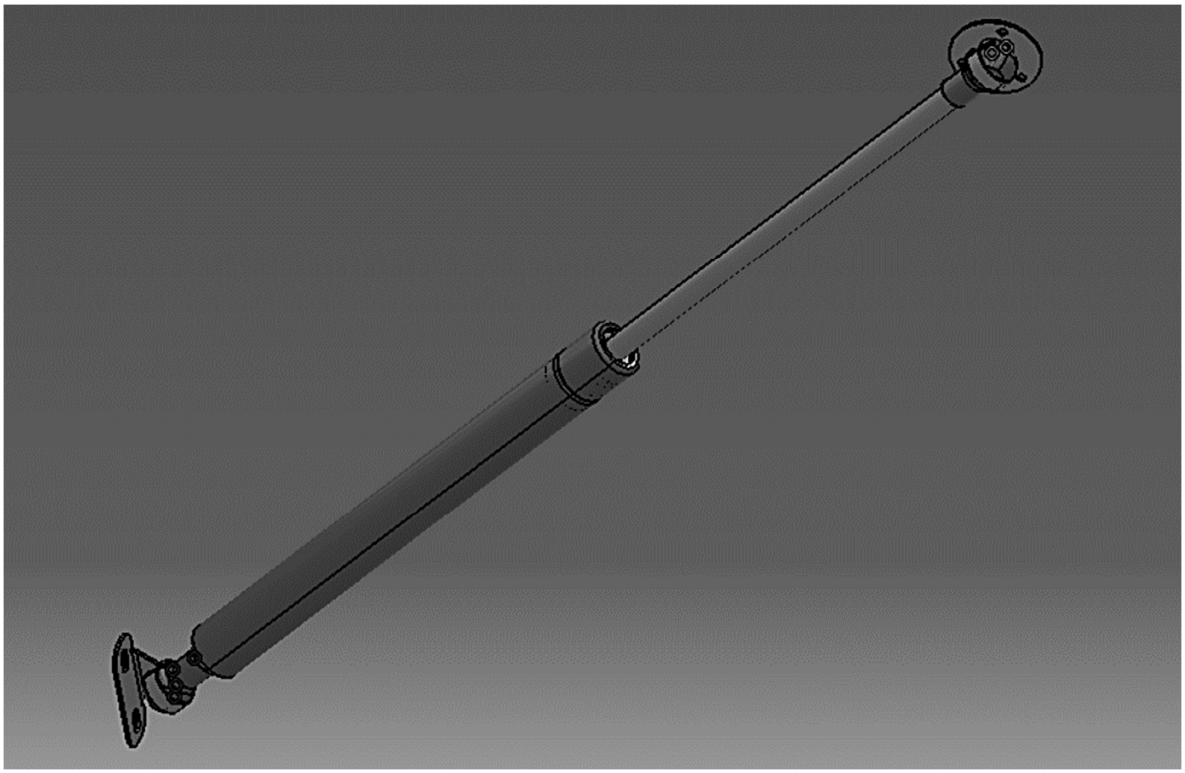
# 4. SYSTEM SPECIFICATION

## 4.1 HARDWARE SPECIFICATION

- Piston and Cylinder
- Ball Stud Fittings at both end
- 2 Holder
- Hydraulic Fluid

# CHAPTER 5

# DATA FLOW DIAGRAM



# CHAPTER 6

# RESULT AND DISCUSSIONS

The results obtained were found to be satisfactory and the accuracy was measured up to 92.17%. It completely meets the objectives and requirements of the system. The framework has achieved an unfaltering state where all the bugs have been disposed. It completely avoid the man power will opening the seat in scooters. Our next aim is to notify the closing time and based on IOT, we will implement this system by open and closing system which more helpful to the scooter riders not to use their hand for opening and closing the seat again and again. Man Power in closing and opening seat may vary and the seat lock may get wear and broken. It is the next scope of the project.

# CHAPTER 7

# CONCLUSION

In conclusion, the integration of a hydraulic seat opener utilizing a gas spring for scooters enhances user convenience and ergonomic design. This innovative system not only simplifies the process of accessing the storage compartment beneath the seat but also contributes to a smoother and more user-friendly riding experience. The efficiency and reliability of the hydraulic seat opener make it a valuable addition to scooter design, emphasizing practicality and user comfort in urban mobility solutions.

## ISOMETRIC VIEWS