STONE BREAKING MACHINE USING WITH GRASSHOPPER JUMPING MECHANISM

A PROJECT REPORT

Submitted by

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in partial fulfillment for the award of the degree

of

BACHELOR OF ENGINEERING

in

MECHANICAL ENGINEERING

M.KUMARASAMY COLLEGE OF ENGINEERING, KARUR

ANNA UNIVERSITY: CHENNAI 600 025

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M.KUMARASAMY COLLEGE OF ENGINEERING, KARUR

BONAFIDE CERTIFICATE

Certified that this project report **"**STONE BREAKING MACHINE USING WITH GRASSHOPPER JUMPING MECHANISM**"** is the bonafide work of **ARAVINDH.S (927622BME003) , ASWINKUMAR.D (927622BME004) , ATHAVAN.M (927622BME005)** 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 herein 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 **"**FABRICATION OF AUTOMATIC BLACKBOARD CLEANING SYSTEM BY USING VACUUM**"** being submitted in partial fulfillment of for the award of Bachelor of Engineering in 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. ARAVINDH S	----------
2. ASWINKUMAR D	----------
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Name and signature of the supervisor with date

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INSTITUTION VISION & MISSION

Vision

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

Mission

- Produce smart technocrats with empirical knowledge who can surmount 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 multicultural 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: 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

Cos	COURSESTATEMENT	BLOOMS LEVEL	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
1	Formulate a real world problem, identify the requirement and develop the design solutions.	K3	3	3	3			3	3	3	3	3			3	3	3
2	Identify technical ideas, strategies and methodologies	K3	3	3	3			3	3	3	3	3			3	3	3
3	Utilize the new tools, algorithms, techniques that contribute to obtain the solution of the project	K4	3	3	3	3	3	3	3	3	3	3		3	3	3	3
4	Test and validate through conformance of the developed prototype and analysis the cost-effectiveness.	K4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
5	Prepare report and present oral demonstration	K4	3							3	3	3		3	3		3
	Average		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3

ABSTRACT

The Stone Breaking Machine with Grasshopper Jumping Mechanism is an innovative system designed to improve efficiency in stone processing and mobility across uneven terrains. The machine integrates a powerful stone-breaking unit with a grasshopper-inspired jumping mechanism, utilizing spring-loaded legs for dynamic movement. This dual-functionality design eliminates the need for additional transport equipment, making it ideal for use in rugged environments like quarries, construction sites, and disaster zones. By mimicking the energy-efficient jumping motion of a grasshopper, the machine achieves enhanced mobility while reducing fuel consumption. With potential applications in various industries, this concept combines versatility, energy efficiency, and cost-effectiveness, offering a novel solution to challenges in terrain navigation and material processing.

SCOPE OF OUR PROJECT

The Stone Breaking Machine with Grasshopper Jumping Mechanism is designed to revolutionize stone processing and mobility in challenging terrains. Its scope encompasses:

1. Industrial Applications: Quarries, construction sites, and mining operations requiring efficient stone crushing and transport in rugged environments.

2. Terrain Adaptability: Navigating uneven or rocky landscapes using a grasshopper-inspired jumping mechanism.

3. Efficiency: Reducing dependence on additional transport equipment while enhancing energy efficiency and productivity.

4. Innovation: Leveraging biomimicry and advanced mechanical design to address existing limitations in stone-breaking machinery.

5. Versatility: Potential use in disaster relief operations for clearing debris or in remote areas with minimal infrastructure.

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