

ELECTRIC GRASS CUTTER**¹Mr. Korshetti V.V., ²Mr. BIRAJDAR S. S., ³Mr. MALI S. C., ⁴HIPPARGI M. S., ⁵MALI V. D.**Lecturer Department of Mechanical Engineering, SVSMD's KKI Polytechnic, Akkalkot, Maharashtra, India.¹Student, Department of Mechanical Engineering, SVSMD's KKI Polytechnic, Akkalkot, Maharashtra, India.^{2,3,4,5}svsmdmechdept@gmail.com**ABSTRACT**

An electric grass cutting machine is a modern gardening and landscaping tool designed to trim, cut, and maintain grass in lawns, gardens, parks, and other green areas. It is an improved alternative to traditional manual tools such as sickles and hand shears, which require more time, effort, and physical labor. With the advancement of technology and increasing focus on efficiency and environmental protection, electric grass cutters have become widely popular in both residential and commercial applications.

The machine operates using electrical energy, which is converted into mechanical energy through an electric motor. This motor drives a rapidly rotating cutting element, such as a metal blade or a nylon cutting string, which effectively cuts grass to a uniform height. Depending on the design, electric grass cutting machines are available in two main types: corded models, which operate by direct connection to a power supply, and battery-powered models, which offer greater mobility and convenience.

One of the key reasons for the growing use of electric grass cutting machines is their eco-friendly nature. Unlike petrol-powered lawn mowers, electric models do not produce harmful emissions or air pollution. This makes them suitable for use in environmentally sensitive areas such as schools, residential colonies, and public parks. Additionally, they operate with less noise, contributing to a quieter and more comfortable environment.

Another important aspect of electric grass cutting machines is their ease of use. They are generally lightweight, require less maintenance, and are simpler to operate compared to fuel-based machines. This makes them accessible to a wide range of users, including homeowners, gardeners, and landscaping professionals. Furthermore, they provide precise and uniform cutting, which enhances the overall appearance of lawns and gardens.

In recent years, improvements in battery technology and motor efficiency have further increased the performance and popularity of these machines. As a result, electric grass cutting machines are becoming an essential tool in modern horticulture and landscaping, supporting both aesthetic maintenance and environmental sustainability.

INTRODUCTION

A literature survey on electric grass cutting machines shows the development, improvements, and applications of these devices over time. Researchers and manufacturers have focused on improving efficiency, reducing environmental impact, and making lawn maintenance easier for users. Early studies on grass cutting tools mainly dealt with manual equipment like sickles and hand push mowers, which required high human effort and were time-consuming. With industrial development, mechanical and fuel-powered lawn mowers were introduced, which significantly reduced physical labor but increased noise, pollution, and maintenance requirements.

In recent years, attention has shifted toward electric grass cutting machines due to growing environmental concerns and advancements in electrical and battery technologies. Studies indicate that electric motors

provide efficient torque with lower energy consumption compared to internal combustion engines used in petrol mowers. According to various engineering analyses, electric grass cutters are more suitable for small to medium-sized lawns because they offer sufficient cutting power while maintaining low operational cost. Research has also highlighted the importance of blade design and cutting mechanisms. Rotary blade systems and nylon string trimmers are commonly used, each having specific advantages. Rotary blades are effective for thicker grass, while string trimmers are preferred for precision work around edges and obstacles. Improvements in ergonomic design, such as adjustable handles and lightweight materials, have also been discussed in literature to enhance user comfort and reduce fatigue during operation.

Battery technology, especially lithium-ion batteries, has played a major role in the advancement of cordless grass cutting machines. Studies show that modern battery-powered models provide longer operating time, faster charging, and improved portability compared to older nickel-based batteries. Additionally, the integration of brushless DC motors has improved energy efficiency, reduced maintenance, and increased the lifespan of these machines.

Overall, literature suggests that electric grass cutting machines are evolving toward higher efficiency, better safety, and greater environmental sustainability. Continuous research is focused on improving power management systems, blade optimization, and smart features such as automated cutting and sensor-based navigation for future development.

Construction Working

An electric grass cutting machine is made up of several mechanical and electrical components that work together to cut grass efficiently. The main parts of the machine are:

1. Electric Motor

The electric motor is the heart of the machine. It converts electrical energy into mechanical rotational energy. It is usually a **universal motor** or **brushless DC motor** depending on the model.

2. Cutting System

The cutting unit consists of:

- **Rotary metal blade OR**
- **Nylon string (trimmer line)**

The blade or string is attached to a rotating head and performs the actual grass cutting.

3. Shaft

A long shaft connects the motor to the cutting head. It transfers rotational motion from the motor to the blades.

4. Handle

The handle is used by the operator to control and guide the machine. It is usually adjustable for comfort and easy handling.

5. Power Supply System

The machine may use:

- **Electric cord (wired models)** connected to AC supply
- **Rechargeable battery pack (cordless models)**

6. Safety Guard

A protective cover is placed near the cutting area to prevent grass, stones, or debris from hitting the operator.

7. Switch and Control Unit

It includes an ON/OFF switch and sometimes speed control for safe operation.

Working Principle

The electric grass cutting machine works on the principle of converting electrical energy into mechanical energy using an electric motor.

Step-by-step working:

1. When the machine is switched ON, electric current flows to the motor.
2. The motor starts rotating at high speed.
3. This rotation is transferred to the cutting head through the shaft.
4. The blade or nylon string attached to the head rotates rapidly.
5. When the rotating blade comes in contact with grass, it cuts it at a uniform height.
6. The safety guard prevents grass cuttings and small stones from hitting the user.

WORKING MECHANISM

- Electric energy → Motor rotation → Blade rotation → Grass cutting
- The faster the rotation, the cleaner and smoother the cutting result.



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CONCLUSION

This study has thoroughly explored [your research topic], focusing on specific objectives or research questions. The analysis and results reveal that [summarize the main findings clearly]. These findings not only address the research questions but also provide valuable insights into the broader context or field.

The study highlights several key implications. Theoretically, it contributes to a better understanding of specific concepts or relationships and strengthens existing knowledge in [field]. Practically, the findings offer guidance for professionals, organizations, policymakers] by suggesting specific applications or strategies, which can improve [processes, outcomes, or decision-making].

Despite these contributions, the research has certain limitations. These include [sample size, scope, methodology, time constraints, etc.], which may affect the generalizability of the results. Awareness of these limitations is crucial for interpreting the findings accurately and for planning future studies.

For future research, it is recommended to examine [related variables, larger populations, different contexts, or new methodologies. Such studies could further validate the results of this research and expand the understanding of topic. Additionally, employing advanced methods, longer study periods, or cross-disciplinary approaches] may yield more comprehensive insights.

In summary, this research has achieved its objectives by providing both theoretical and practical contributions to [field or area of study]. It establishes a foundation for ongoing research and encourages further exploration to address remaining questions and challenges. Ultimately, this study underscores the importance of [topic] and its impact on [society, industry, or academic knowledge].

FUTURE SCOPE

The current study has provided important insights into [your research topic], but there is significant potential for further exploration. The following areas can be considered for future research:

1. **Broader Study Area:** Future studies can expand to cover a larger geographic region or more diverse populations. This will help in validating the findings and making them more generalizable across different contexts.
2. **Inclusion of Additional Variables:** This research focused on [specific variables]. Future research can examine additional factors such as [examples], which may influence the outcomes and provide a more holistic understanding of [topic].
3. **Advanced Research Techniques:** Employing advanced methodologies such as [machine learning, simulation models, longitudinal analysis, or experimental designs] can enhance the precision, depth, and reliability of future studies.
4. **Longitudinal and Trend Analysis:** Conducting long-term studies will help observe changes, trends, and patterns over time, offering insights into the evolving nature of [topic].
5. **Practical Implementation:** Future research can focus on applying the findings in real-world scenarios to evaluate their effectiveness and impact on [industry, community, or society].
6. **Interdisciplinary Research:** Studying [topic] through an interdisciplinary approach by integrating perspectives from [related fields] may lead to innovative strategies and solutions.
7. **Policy and Strategic Insights:** Further research can provide recommendations for policymakers, organizations, or industries, guiding strategic decisions and contributing to improved practices

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