

Research and Development Data

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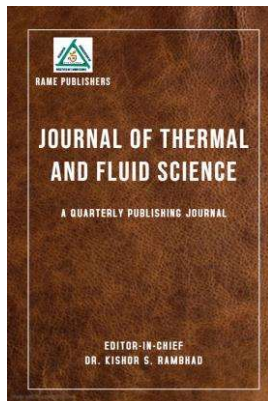
Sr. no	Title of Paper	Type of Paper	Date	Year	Author
1	Design and Fabrication of Solar Powered Sea Water Desalination System	Research Paper	18-07-2024	2024-25	Sagar Patil
2	Design and Fabrication of Frictionless Power Generation Through Wheel	Research Paper	18-07-2024	2024-25	Sagar Patil
3	EMBEDDED EDGE AI BASED SOLAR PANEL ROBOT ASSISTANT, Positif Journal, Issn No : 0048-4911, Vol 24, Issue 7, 2024, pp 11-21	Research Paper	Jul-24	2024-25	S.S. Pawar & H.S. Pawar
4	Exploring the evolution and impact of automatic feeding mechanisms in sheet metal processing: From manual labor to automation. AIP Conf. Proc. 31 January 2025; 3255 (1): 040002. https://doi.org/10.1063/5.0254987	Research Paper	31-01-2025	2024-25	Dr. Kishor Rambhad
5	Investigations in effect of various alloy metal concentration in aluminum alloys on mechanical properties manufactured by automated direct chill casting process. AIP Conf. Proc. 31 January 2025; 3255 (1): 040001. https://doi.org/10.1063/5.0254632	Research Paper	31-01-2025	2024-25	Dr. Kishor Rambhad

Design and Fabrication of Solar Powered Sea Water Desalination System

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Abstract: The proposed system combines solar energy collecting and desalination techniques to efficiently remove salts and contaminants from saltwater. Solar collectors for energy capture, a heat exchanger system for thermal energy transfer, and a multistage distillation unit for water purification are all essential components. The system works on the principle of evaporation and condensation, using solar heat to vaporize seawater and then condensing the vapour into freshwater. During the design phase, system efficiency, scalability, and durability were prioritized. Advanced modelling approaches were used to optimize the system's performance under different environmental circumstances. In addition, material selection was based on durability and corrosion resistance to assure the system's longevity and reliability. The fabrication process included component assembly utilizing normal engineering standards, as well as the use of quality control procedures to ensure operating efficiency. Prototype testing was used to confirm the system's functionality and performance measures, such as water production rate, energy efficiency, and salt rejection rate. The findings show that the solar sea water desalination system is both feasible and effective in producing high-quality freshwater from seawater using renewable sun energy. The technique provides a sustainable alternative to existing desalination processes, with the potential for widespread implementation in coastal locations experiencing water scarcity. Future research directions could include greater optimization of system components, cost-cutting methods, and scalability for large-scale deployment.

Keywords: Water Desalination; Solar Panel; Purifier

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1. Introduction

One of the most important resources in the world is water. 30% of earth island and 70% iswater. Water is absolutely necessary for both human survival an animal wellbeing [1]. The process of purifying water involves eliminating unwanted chemicals, suspended sediments,biological pollutants and gases [1]. According to our survey of doctors the average amount ofwater that a male or female should drink each day to maintain a healthy lifestyle is roughly 3.7 liters / 2.7 liters [3]. In India water-born illness like cholera, diarrhea typhoid caused roughly 2439 deaths and nearly 1.5 million cases of the disease [4]. A water resource must to be both reasonably priced and trustworthy. In many parts of the nation the water is brackish [5], saline or polluted. One of the main issues in the Mumbai district and the coastal areas of Thane is salinity [6]. Water purification can be achieved through the RO process, and sunlight is one of the conventional energy sources that can be used to power our system [7]. The most reliable way to purify contaminated water is RO filtration. The RO systems semi permeable membrane removes excess minerals and other soluble particles from the water including bacteria fungi algae and viruses [8]. The device efficiently removes particles as small as 0.0001 microns while turning the motor in India, access to clean drinking water is a big issue in both rural and urban areas [9]. There are numerous conventional techniques for purifying drinking water chlorine pills, pots for chlorinating wells, fast and slow sand filters, and fluoride remover are among the technique used, but they are more complicated to use and have in a tank and supply power to a RO system for the purification process [10]. In the event of an environmental issue or power outage such as a flood or other disaster the solar purifiers battery stores energy, enabling the process to continue using solar power [11]. It is a simple to assemble portable purifier that can be used in remote locations without electricity [12]. Pollution-free operation is provided by this purifier [13].

Design and Fabrication of Frictionless Power Generation Through Wheel

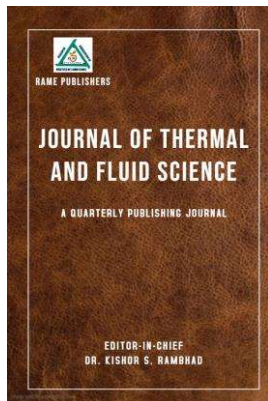
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Abstract: This project aims to design and fabricate a novel system for frictionless power generation by harnessing the principles of Faraday's law of electromagnetic induction. Traditional methods of power generation often involve friction and mechanical wear, leading to energy loss and maintenance issue. In this project, we propose a solution that minimizes friction and maximizes efficiency by leveraging the rotational motion of the wheel. The core principle behind this system involves placing conductive coil strategically around the circumference of a rotating wheel. As the wheel rotates, the magnetic field created by permanent magnets embedded within the wheel induces an electric current in the coil, according to Faraday's law. This induced current can then be harvested and utilized to generate electrical power. By minimizing friction, the system can efficiently convert kinetic energy into electrical power.

Keywords: Power Generation, Magnets, Coil, Frictionless, Faraday's Law



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1. Introduction

In the quest for sustainable energy solutions, there is an increasing demand for innovative approaches to power generation that minimize energy loss, reduce environmental impact and enhance overall efficiency. Traditional methods of power generation often rely on mechanisms that involve friction and mechanical wear, leading to energy wastage and maintenance challenges. In response to these limitations, there is a growing interest in developing frictionless power generation systems that capitalize on advanced principles of physics and engineering [1].

The concept of harnessing rotational motion for power generation is not new, but conventional methods have typically been plagued by friction-related issues. However, recent advancements in materials science, engineering, and design have opened new possibilities for frictionless power generation through innovative wheel-based systems. The project titled "Design and Fabrication of Frictionless Power Generation through Wheel by Applying Faraday's Law" addresses this challenge by proposing a novel system that harnesses the principles of electromagnetic induction, specifically Faraday's law, to generate electrical power without the drawbacks of friction-based mechanisms. By leveraging rotational motion and magnetic fields, the project aims to design and fabricate a system capable of efficiently converting mechanical energy into electrical energy, thus offering a sustainable and efficient solution to power generation. Faraday's law of electromagnetic induction, formulated by the renowned physicist Michael Faraday in the 19th century, states that a changing magnetic field induces an electromotive force (EMF) in a conductor, leading to the generation of an electric current [2]. This fundamental principle forms the basis for numerous technologies, including generators, transformers, and electric motors. By applying Faraday's law within the context of a rotating wheel system, this project seeks to create a frictionless power generation mechanism that operates with minimal energy loss and mechanical wear. The significance of this project lies in its potential to revolutionize the way electrical power is generated, particularly in environments where traditional methods may be impractical or inefficient. By eliminating friction, the proposed system offers advantages such as reduced maintenance requirements, increased longevity, and enhanced energy efficiency [3].

Exploring the evolution and impact of automatic feeding mechanisms in sheet metal processing: From manual labor to automation 🛒

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+ Author & Article Information

AIP Conf. Proc. 3255, 040002 (2025)

<https://doi.org/10.1063/5.0254987>

Automatic feeding mechanisms play a crucial role in enhancing productivity, efficiency, and safety in sheet metal cutting processes across various industries. This review paper provides a comprehensive overview of automatic feeding mechanisms for sheet metal cutting machines, covering their evolution, types, applications, benefits, challenges, and future prospects. The review explores the historical development of automatic feeding mechanisms from manual methods to modern automated systems and examines various types such as roller feeds, servo feeds, gripper feeds, and pneumatic feeds, detailing their working principles, advantages, and limitations. Furthermore, it explores the diverse applications of automatic feeding mechanisms across industries including automotive, aerospace, electronics, and construction, with case studies illustrating their utilization in specific cutting processes. The paper also discusses the benefits of automatic feeding mechanisms, including increased productivity, accuracy, repeatability, and worker safety, along with the reduction of material waste and downtime. Additionally, it identifies

Investigations in effect of various alloy metal concentration in aluminum alloys on mechanical properties manufactured by automated direct chill casting process

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Aluminum alloy casting specially used in aerospace and defense sector. The properties of alloy were depends upon concentration of alloy element. In this investigation sample of Al alloys AL1, AL2 and AL3 prepared using DC cast process under 650 to 800 °C temperature and tested for mechanical properties using universal testing machine and Vickers hardness tester. The composition of various alloy element (Cu: 1.3-1.51 %, Mg: 2.27-2.48%, Cr: 0.24%, Zn: 5.3-5.61%) were used to prepare samples AL1, AL2 and AL3. Results indicated that UTS trends are increasing initially and then in downward direction with increasing composition of alloy element. Proof stress also showing increasing trends and then decreasing trends. However. Elongation and hardness increases and then decreases. The maximum UTS (582MPa) and Proof stress (530MPa) was reported in AL2 sample due to high Mg alloy concentration. However, maximum elongation (13.6%) and hardness (168 HV) was reported in AL3 sample due to high Cu and Zn alloy element concentration.
