

Proceedings of 3rd International Conference on New and Renewable Energy Resources for Sustainable Future

ICONRER-2021

February 11-13, 2021

Editor
Prof. Ashish Nayyar



**Swami Keshvanand Institute of Technology,
Management & Gramothan, Jaipur**

Table of Contents

SCOPE OF RENEWABLE ENERGY UTILIZATION IN INDIA	1
SCENARIO OF COOLING SYSTEMS POWERED BY SOLAR ENERGY IN INDIA	6
SPEED CONTROL OF DC MOTOR USING ANDROID APPLICATION AND RF	12
SOLAR ENERGY DEVELOPMENT, TRENDS AND INITIATIVES IN CONTEXT OF INDIAN AND RAJASTHAN STATE GOVERNMENT	17
INVENTORY MANAGEMENT OF RESIDENTIAL SOLAR PANELS	26
ZNO/MGO/ITO STRUCTURED SOLAR CELL FOR ULTRAVIOLET PHOTO DETECTOR APPLICATION	33
ELECTRICAL CHARACTERISTICS OF CDS/CDTE BASED INORGANIC SOLAR CELLS: EFFECT OF CDS LAYER THICKNESS	39
A REVIEW ON PERFORMANCE ENHANCEMENT METHODS FOR SOLAR STILL	44
NEW PROSPECT AND HORIZON FOR RENEWABLE ENERGY IN INDIA	52
INVESTIGATION OF THE EFFECTS OF TERNARY DIESEL-ADDITIVES BLENDS ON VCR DIESEL ENGINE	60
COMPARISON OF MECHANICAL BEHAVIOUR OF PP COMPOSITES FABRICATED BY PLASTIC INJECTION MOULDING	65
DESIGN AND SIMULATION OF 3D PRINTED HOVERCRAFT AS A RESUPPLY VEHICLE WITH CFD	71
ELECTRIC POWER GENERATION USING HYBRID SYSTEM-A REVIEW PAPER	80
WIRELESS POWER TRANSMISSION	87
ANAEROBIC CO DIGESTION OF FOOD WASTE: A REVIEW ON SUSTAINABLE APPROACH FOR FOOD WASTE MANAGEMENT AND PRODUCTION OF BIOENERGY	97
FABRICATION AND TESTING OF BANANA FIBRE REINFORCEMENT POLYMER COMPOSITES	103
SELECTION OF OPTIMUM PARAMETERS FOR ELECTRO-CHEMICAL MACHINING (ECM) USING GENETIC ALGORITHM	116
CONVERSION OF PLASTIC WASTE TO FUEL BY PYROLYSIS: A REVIEW	121

INVESTIGATION OF THE EFFECTS OF TERNARY DIESEL-ADDITIVES BLENDS ON VCR DIESEL ENGINE

Naveen Kumar Sain¹, Ashish Nayyar², Chandan Kumar³

^{1,2,3}Department of Mechanical Engineering, Swami Keshvanand Institute of Technology, Management & Gramothan, Jaipur, India
Corresponding Author Email: naveen.sain@skit.ac.in

Abstract

This study investigates the effects of diesel- n-butanol- nitromethane replacing conventional diesel fuels to enable clean combustion of a modern CI engine. The engine experiments are conducted with diesel- n-butanol- nitromethane blends to examine the combustion characteristics of CI engine. Many research works have been done out to improve combustion by different methods. Out of those, the use of alternative fuels and additives seems to be a potential solution to improve combustion in the current scenario. n-butanol and nitromethane were selected as additives to diesel by literature review, physical and chemical properties, availability in the market and their cost. In the first phase, experiments were performed to optimize n-butanol-diesel blend on an existing engine, and in the second phase, nitromethane was blended in the optimum n-butanol-diesel blend. A single cylinder four stroke, water cooled engine (Kirloskar TV1) has been used for experimentation. The results of performance for NM-n-butanol-diesel blends have been drawn and analyzed. An increment of 9.81% in BTE has been observed in comparison to diesel at rated power.

Keywords: Diesel, n-butanol, nitromethane, Performance.

INTRODUCTION

Diesel engines are major contributors in transportation automobile and agriculture sector at present all over the world [1]. One major area of research related to this field is alternative fuels for enhancing the performance. In addition to this, use of additives with diesel is the current issue of research. Alcohols and oxygenated additives present such options with their suitability for blending in diesel for existing engines [2-4]. The blending of alcohol increases the availability of oxygen in the combustion chamber due to which combustion characteristics improve. In this research work, n-butanol (B) and nitromethane (NM) were blended with diesel successively to improve the performance [5-7]. n-butanol (C₄H₉OH) was chosen as an additive with diesel due to its higher heating value, higher cetane number, good miscibility with diesel and being less hydrophilic in comparison to methanol and ethanol. Nitromethane (CH₃NO₂) was taken as a nitrogenated additive to improve oxygen content and performance of n-butanol diesel blend. The oxygen content of nitromethane is fairly high, and the higher presence of oxygen in its molecular structure provides better combustion efficiency [8-10]. The baseline data was generated with diesel on normal settings of the engine specified by the manufacturer. By baseline experiments with diesel, 18.5:1 compression ratio, 210 bar injection pressure and 23° before top dead centre (btdc) injection timing were used as optimum engine parameters. After selection of suitable engine parameters, tests were conducted for optimization of blended fuel for performance and emissions. The properties of fuel and additives are shown in Table 1 [10-16].

ICONRER-2021

Renewable energy and sustainable development are the key technologies to offer solutions to the ever-increasing environmental pollutions and depleting conventional fuel reserves. With an aim to discuss the state of art technologies pertaining to the renewable energy domain, RTU (ATU) TEQIP III Sponsored 3rd International Conference on New and Renewable Energy Resources for Sustainable Future (ICONRER-2021) was organized by the Department of Mechanical Engineering, Swami Keshvanand Institute of Technology, Management and Gramothan, Jaipur in collaboration with Rajasthan Technical University and Department of Mechanical Engineering, Assiut University, Assiut (Egypt) from February 11 to 13, 2021. ICONRER is a series of the conference started in 2017 and it was 3rd event of that series.



**Swami Keshvanand Institute of Technology,
Management & Gramothan**

Ramnagar, Jagatpura, Jaipur-302017, Rajasthan

Tel. : +91-0141- 3500300, 5160400, 2759609, 2752165 & 2752167 | Fax: +91-0141-2759555

Website: www.skit.ac.in | E-mail: info@skit.ac.in

ISBN:978-81-954233-3-0

