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Journal Name:	**Journal of Energy Research and Reviews**
Manuscript Number:	**Ms_JENRR_125852**
Title of the Manuscript:	**Theoretical Analysis of Performance Characteristics of Non- Road Spark Ignition Engines**
Type of the Article	**Research Article**

General guidelines for the Peer Review process:

This journal's peer review policy states that **NO** manuscript should be rejected only on the basis of '**lack of Novelty'**, provided the manuscript is scientifically robust and technically sound.
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PART 1: Review Comments

Compulsory REVISION comments	**Reviewer's comment**	**Author's Feedback** *(Please correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)*
Please write a few sentences regarding the importance of this manuscript for the scientific community. Why do you like (or dislike) this manuscript? A minimum of 3-4 sentences may be required for this part.	**Review of "Theoretical Analysis of Performance Characteristics of Non-Road Spark Ignition Engines"** **Overview** **The paper presents a comprehensive theoretical analysis of the performance characteristics of non-road spark ignition (SI) engines specifically in the context of Nigeria. The authors explore the effects of various operating parameters such as engine speed, engine load, and equivalence ratio on performance metrics including fuel efficiency, power output, thermal efficiency, and emissions.** **Abstract** **The abstract effectively summarizes the key objectives and findings of the study. However, it could benefit from clearer definitions of terms like "theoretical analysis" and more specific results from the simulations. It would also be useful to mention the broader implications of these findings for policy or practice in Nigeria.** **Suggestions:** **• Clearly define "theoretical analysis."** **• Summarize the key findings with specific values (e.g., maximum power output, minimum fuel consumption).** **• Highlight the potential impact of the findings on environmental policies in Nigeria.** **Introduction** **The introduction sets a solid context for the research, outlining the significance of non-road SI engines in Nigeria's economy. It discusses the challenges posed by environmental conditions and fuel quality.** **Suggestions:** **• Incorporate citations more seamlessly; ensure all statements are supported by references.** **• Clarify the gap in research specifically related to Nigeria's unique conditions.** **• Enhance the flow by grouping similar ideas together.** **Methodology** **The methodology section is detailed and presents the operating and performance parameters systematically. The use of a two-zone engine model is well-explained, providing insight into the assumptions and calculations involved.** **Suggestions:** **• Consider adding a diagram or flowchart to visually represent the methodology.** **• Include more detail on how the MATLAB program was developed and its specific functionalities.** **• Clarify the rationale behind choosing specific values for the parameters, such as the baseline values for engine load and speed.** **Results and Discussion** **This section presents a thorough analysis of the results obtained from the simulations. The figures and tables effectively illustrate the relationships between different parameters.** **Suggestions:** **• Ensure all figures and tables are clearly labeled and referenced in the text.** **• Discuss any anomalies or unexpected results in greater detail.** **• Consider including a comparison with existing literature to validate the findings further.** **• Ensure consistency in terminology when referring to the same parameters (e.g., "engine speed" vs. "rpm").** **Conclusions** **The conclusions succinctly summarize the findings but could be strengthened by emphasizing the practical implications of the research.** **Suggestions:** **• Suggest specific recommendations for stakeholders (e.g., policymakers, engine manufacturers).** **• Discuss how this study can pave the way for future research or technological advancements in engine design.** **General Comments** **Clarity and Readability: The writing is generally clear, but there are instances where sentences could be more concise. Aim for precision without sacrificing clarity.** **References: Ensure that all references are cited correctly and that the reference list is complete. Consider using a consistent citation style throughout the paper.**	

	Figures and Tables: Ensure that all figures and tables are appropriately referenced in the text and that their significance is explained. Consider including captions that summarize key insights. **Environmental Considerations: Given the focus on emissions, a more in-depth discussion of the environmental implications of the findings would enhance the relevance of the research.** **Technical Details: Include any assumptions made in the modeling process, as this can help in understanding the scope and limitations of the study.** **Conclusion** **Overall, the paper provides a significant contribution to the understanding of non-road SI engines in Nigeria, highlighting critical areas for performance optimization under local conditions. With minor revisions for clarity, structure, and depth, it can effectively inform future research and practical applications in this field.** **Review of References** **Citation Formatting:** **Ensure consistency in citation styles. For example, use the same format for journal titles (e.g., italics for all) and maintain uniformity in punctuation (e.g., periods, commas).** **Standardize the format for journal articles, including volume, issue numbers, and page ranges.** **Specific Suggestions:** **Reference [1]: Add the access date for the online resource.** **Reference [2]: Correct the spacing between initials in author names (e.g., "A.S. Onawunmi" instead of "Onawunmi A.S.").** **Reference [3]: Include the publisher's name clearly and confirm the edition.** **Reference [4]: Ensure proper use of "Vol." and "Pp." (e.g., "Vol. 248, pp. 626-639").** **Reference [5]: Review the journal title for consistency with other entries.** **Reference [10]: Similar to [1], include the access date.** **Reference [19]: Ensure proper citation of DOI format (e.g., "doi:10.1016/j.energy.2023.127398").** **Missing Information:** **Ensure all references have complete details: confirm all authors are listed, all titles are correct, and page ranges are complete.** **For online articles, confirm that URLs are functioning and add the date accessed.** **Cross-referencing:** **In the main body of the paper, ensure that citations are properly numbered and correspond accurately to the reference list.** **Content Relevance:** **Ensure that all references are relevant to the topic of non-road spark ignition engines and their performance characteristics. Any references that seem tangential could be reconsidered or replaced with more pertinent studies.** **Diversity of Sources:** **Aim for a diverse range of sources, including recent studies, reviews, and foundational texts. This will strengthen the research context.** **Updates:** **Consider including more recent studies (2022-2023) where applicable to ensure that the literature review reflects the latest developments in the field.** **The reviewed manuscript is significant for the scientific community as it synthesizes recent advancements in combustion and emission characteristics of spark-ignition engines, an area of critical importance in addressing environmental concerns and improving engine efficiency. By integrating diverse studies and methodologies, the manuscript provides a comprehensive overview that can guide future research and inform policy decisions regarding alternative fuels and emissions regulations. I appreciate the manuscript's thoroughness and its potential to foster collaboration among researchers focused on sustainable energy solutions. However, the manuscript could benefit from clearer organization and a more focused narrative to enhance readability and impact**	
Is the title of the article suitable? **(If not please suggest an alternative title)**	**The title of the article, "Theoretical Analysis of Performance Characteristics of Non-Road Spark Ignition Engines," is generally suitable as it accurately reflects the content and focus of the study. However, it could be made more specific and engaging.A suggested alternative title could be: "Optimizing Performance and Emissions of Non-Road Spark Ignition Engines in Nigeria: A Theoretical Approach." This title highlights the optimization aspect and emphasizes the geographical context, making it more appealing to potential readers.**	

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Is the abstract of the article comprehensive? Do you suggest the addition (or deletion) of some points in this section? Please write your suggestions here.	**The abstract is fairly comprehensive, as it outlines the importance of non-road spark ignition engines in Nigeria, the focus of the study, and the key findings. However, it could be improved by incorporating a few additional points for clarity and completeness:** **i. Briefly mention the broader implications of optimizing engine performance and emissions, particularly in terms of environmental impact and sustainability.** **ii. Specify that the theoretical analysis was conducted using a two-zone SI engine model, as this detail provides insight into the approach taken.** **iii. While it mentions optimal engine speed and equivalence ratio, adding a summary of the implications of these findings on fuel efficiency and emissions would strengthen the conclusion.** **iv. Explicitly state the gap in existing research that this study addresses to highlight its relevance.** **Incorporating these suggestions could make the abstract more informative and engaging for readers.**	
Are subsections and structure of the manuscript appropriate?	**The subsections and overall structure of the manuscript are generally appropriate for conveying the research effectively. The division into clear sections—such as Introduction, Materials and Methods, Results and Discussion, and Conclusions—facilitates reader understanding.** **Strengths:** **1. The manuscript follows a logical progression from background information to methodology, results, and conclusions.** **2. The Materials and Methods section is thorough, outlining the operating parameters and performance metrics clearly.** **Suggestions for Improvement:** **1. Some subsections could benefit from clearer headings that reflect their content more specifically, particularly in the Results section. For example, instead of just "Results and Discussion," consider breaking it down into "Results" and "Discussion" for better clarity.** **2. Incorporating more visual aids, such as charts or graphs, especially in the Results section, could help present data more effectively and enhance reader engagement.** **3. A brief summary at the end of each major section could reinforce key points and aid in retention of information.** **Overall, the manuscript is well-structured, but these adjustments could enhance clarity and reader engagement.**	
Please write a few sentences regarding the scientific correctness of this manuscript. Why do you think that this manuscript is scientifically robust and technically sound? A minimum of 3-4 sentences may be required for this part.	**The manuscript demonstrates scientific robustness and technical soundness through its rigorous theoretical analysis of non-road spark ignition engines under specific environmental conditions in Nigeria. The use of a two-zone SI engine model to simulate performance characteristics shows a sophisticated understanding of combustion processes and engine dynamics.Furthermore, the inclusion of multiple operating and performance parameters enhances the depth of the analysis, allowing for a comprehensive evaluation of factors influencing engine efficiency and emissions. The alignment of the findings with existing literature further supports the credibility of the research, indicating that the authors have conducted a thorough investigation into an under-researched area, thus contributing valuable insights to the field.**	
Are the references sufficient and recent? If you have suggestions of additional references, please mention them in the review form.	**The references in the manuscript are generally sufficient and cover a range of relevant topics related to spark ignition engines, combustion processes, and emissions. However, while some references are recent, others, like the 2018 and earlier sources, could be updated to reflect the latest advancements in the field.** **Suggestions for Additional References:** **1. Recent review articles or studies from the past 1-2 years that focus on the performance characteristics of non-road engines or specific environmental impacts could enhance the literature context.** **2. Research that specifically addresses advancements in fuel formulations, emissions reduction technologies, or new modeling techniques in spark ignition engines would provide a more comprehensive background.** **Including these additional references would strengthen the manuscript's foundation and demonstrate awareness of the most current research trends in the field.**	

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Minor REVISION comments **Is the language/English quality of the article suitable for scholarly communications?**	Here are some minor revision comments for the manuscript: Abstract Clarity: The abstract could be more concise. Consider removing redundant phrases, such as "under Nigerian conditions," since this is already implied in the context of the study. Introduction Flow: In the introduction, some sentences are lengthy and complex. Breaking them into shorter sentences would improve readability. For example, the sentence starting with "Nigeria's economy is heavily reliant on..." could be split for clarity. Consistency in Terminology: Ensure that terms like "non-road SI engines" and "spark ignition engines" are used consistently throughout the manuscript. This will help maintain clarity for the reader. Figure and Table References: Ensure that all figures and tables are referenced in the text before they appear. For instance, mention each figure and table in the results section before presenting them. Parameter Definitions: When introducing the performance parameters in the methods section, it may be helpful to briefly define each parameter (e.g., what brake specific fuel consumption means) for readers who may not be familiar with the terminology. Equivalence Ratio Explanation: In the methods section, provide a brief explanation of the significance of the equivalence ratio and how it impacts engine performance, especially for readers unfamiliar with engine thermodynamics. Citation Format: Review the citation format for consistency. For instance, some references include initials after the authors' names while others do not. Ensure all citations follow the same format. Typographical Errors: Check for minor typographical errors, such as inconsistent spacing and punctuation throughout the manuscript. For example, the spacing in the reference list should be uniform. Conclusion Strengthening: The conclusion could benefit from a brief reiteration of the practical implications of the findings. Adding a sentence about how this research could influence engine design or policy in Nigeria would strengthen its impact. References Formatting: Ensure that all references are formatted according to the journal's guidelines, including italics, punctuation, and order of information. These revisions would enhance the manuscript's clarity, consistency, and overall quality. The language and English quality of the manuscript are generally suitable for scholarly communication, but there are areas that could benefit from improvement. While the overall structure is coherent and the technical content is clear, some sentences are overly complex or could be more concise.However, minor grammatical errors and awkward phrasings appear in places, which could affect the readability and professionalism of the work. To enhance the manuscript, it would be beneficial to: 1. Simplify complex sentences for better clarity. 2. Proofread for grammatical accuracy and consistency in terminology. 3. Consider using more precise language in technical descriptions to ensure that concepts are communicated effectively. Addressing these aspects would enhance the manuscript's quality and ensure it meets the standards of scholarly communication.	
Optional/General comments	Here are some optional/general comments on the paper: Clarity and Focus: While the paper presents valuable insights into the performance characteristics of non-road spark ignition engines, some sections could benefit from clearer explanations, especially when introducing technical concepts. Simplifying the language and providing more context for certain terms would enhance reader understanding. Figures and Tables: The inclusion of figures and tables to visually represent data and results is commendable. However, ensuring that all figures and tables are clearly labeled and referenced in the text will improve the manuscript's coherence. Adding captions that summarize key findings from each figure or table would also aid comprehension. Discussion Section: The discussion could be expanded to include a comparison with existing literature, highlighting how the findings align or contrast with previous studies. This would provide readers with a broader context and enhance the significance of the research Future Research Directions: Including a section on potential future research directions based on the findings would strengthen the manuscript. This could guide other researchers interested in this area and suggest ways to build upon the work presented. Proofreading and Editing: A thorough proofreading session to correct minor grammatical issues and improve sentence structure would elevate the overall quality of the paper. Engaging a professional editor or using editing software could be beneficial.Overall, the manuscript provides a strong foundation, but addressing these comments would enhance its clarity, impact, and contribution to the field.	

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PART 2:

	Reviewer's comment	**Author's comment** *(if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)*
Are there ethical issues in this manuscript?	*(If yes, Kindly please write down the ethical issues here in details)*	

Reviewer Details:

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