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REVIEWER'S REPORT

Manuscript No.: IJAR- 58872

Title:"A CONCEPT OF MULTI-CRITERIA OPTIMIZATION OF GLASS-FIBER COMPOSITES FOR MECHANICAL ENGINEERING"

Recommendation:
Accept

Rating	Excel.	Good	Fair	Poor
Originality	Yes			
Techn. Quality		Yes		
Clarity	Yes			
Significance		Yes		

Reviewer Name: Dr. Ashish Yadav

Detailed Reviewer's Report

Reviewer's Comment for Publication.
Acceptance Comment are mentioned below suitable for the paper titled "A CONCEPT OF MULTI-CRITERIA OPTIMIZATION OF GLASS-FIBER COMPOSITES FOR MECHANICAL ENGINEERING"

Reviewer Comments: Accept

Reviewer Comments –

1. Introduction

The manuscript presents a timely and relevant concept for the multi-criteria optimization of glass-fibre-reinforced composites in mechanical engineering. The introduction clearly establishes the need to consider several competing requirements during composite material and structural design. The simultaneous consideration of strength, stiffness, weight, durability, cost, and manufacturability is highly appropriate. The study also recognises the influence of material, structural, manufacturing, operational, economic, and environmental parameters.

2. Literature Review

The literature review provides an appropriate theoretical background on glass-fibre composites, multi-objective optimization, reinforcement architecture, and mechanical engineering applications. The discussion appropriately reflects the complexity of selecting composite materials when several performance criteria must be satisfied simultaneously. The consideration of Pareto optimality and

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compromise solutions is particularly relevant to practical engineering design. Attention to material-property variability and manufacturing deviations further strengthens the scientific basis of the work.

3. Solution Approach

The proposed solution approach is systematic and represents a strong aspect of the manuscript. The sequence from defining structural requirements and design variables to establishing objectives and constraints provides a logical optimization procedure. The integration of multi-objective search methods with finite element modelling and sensitivity analysis is technically appropriate. The use of Pareto-optimal solutions enables designers to evaluate different compromises among strength, stiffness, weight, cost, durability, and manufacturability. The proposed aggregate performance measure also provides a practical mechanism for ranking solutions according to application-specific priorities.

4. Results and Discussion

The results and discussion provide a convincing theoretical justification for the proposed multi-criteria optimization framework. The manuscript effectively demonstrates the importance of considering material variability, manufacturing deviations, and operational loads when assessing the robustness of composite designs. The combination of numerical modelling, sensitivity analysis, and experimental validation offers a suitable basis for evaluating alternative reinforcement architectures and material compositions. The discussion of Pareto-optimal solutions is particularly valuable for supporting informed engineering decisions.

5. Conclusion

The conclusion appropriately summarises the main contribution of the manuscript and highlights the practical value of multi-objective optimization for glass-fibre-reinforced composites. The proposed framework provides a comprehensive basis for selecting material composition and reinforcement architecture according to specific structural and manufacturing requirements. Its consideration of the complete life cycle of mechanical engineering structures further enhances its practical relevance. The integration of optimization, finite element analysis, sensitivity assessment, and experimental validation provides a sound foundation for engineering implementation.