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Composite Materials Selection for Flywheel Using TOPSIS

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Abstract: TOPSIS is a multi-level system that simultaneously reduces the distance from an optimal point to the knot. Solutions from a set of alternatives defined in terms of increasing the distance from the point. Comparative weights of TOPSIS criterion importance can be linked. Compares the results of different weights used. TOPSIS had high quality changes in the rate. Despite the many criteria, TOPSIS is very different from simple composite weight results, this article reviews many applications of TOPSIS using different weight schemes and different distance measurements, as well as a set of previously used multi-dimensional data. With multiple weights. In this paper we used the method of selecting the items in the tops. Replace S Glass-Epoxy FRP, E Glass-Epoxy FRP, Carbon-Epoxy FRP, Kevlar 29-Epoxy FRP, Kevlar 49-Epoxy FRP, Boron-Epoxy FRP. We have taken the fatigue limit; Fracture stiffness, piece strength, price / mass are the evaluation parameters.

1. Introduction

The Multi-Criteria Decision Making System (MCDM) is based on a number of factors criteria, the method used for ranking a limited number of alternatives or alternatives. MCDM is the evaluation of goals and the choice and alternatives that are tailored to the needs. TOPSIS is a multi-level system that simultaneously reduces the distance from the optimal point to the knot point. Identifies solutions from a set of alternatives defined in terms of increasing distance. Comparative weights of TOPSIS criterion importance can be linked. There are several MCDM methods in the literature; one of them is MCDM method. Identifies Solutions Frame A Set OP Pinter Alternatives Past One Erasing Distance. This is a ranking system that is considered to be simpler in fertilization and calculation compared to many MCDM methods. The need for internal relationships and stability is increasing. In other words, Green supply chain management is a set of environmental management criteria integrated with supply chain management. The biggest difference between PROMETHEE and other MCDM companies is that environmental criteria in supply chain management have led managers to integrate with economic criteria. Seems to be progressing at the same time. A move to create a mindset in dealing with optimization issues related to two or more objective processes between economic, business and environmental issues. MOO or Multi-Objective Optimization refers to finding optimal solution values for more than one desired goal.

2. TOPOSIS MCDM

In this paper, we conduct a sophisticated literature review to categorize research into the use of TOPSIS. In the literature, it is one of the PROMETHEE MCDM methods to evaluate compliance with goals and requirements and to select alternatives. We conclude our research TOPSIS is an article with recommendations for future research in forward and practical decision making. This article provides useful insights and educational research on TOPSIS Suggests a framework for future efforts in this area the best solution the technique of order priority in conjunction with TOPSIS was first developed by Hwang and proposed by Yun. The approach is based on integration criteria such MAUT and AHP (the main idea of this method preferred alternative. The positive optimal solution is the Short distance from PIS and very long distance from negative optimal solution (NIS). NIS increases cost criteria. These issues are of fundamental importance to the direct implementation of the system, which is considered to involve three new concepts for panel decision making, i.e. comparing DMs to a scale. Significance depends on the size of the reaction on the DMs and the veto limits.

3. Materials Selection

The author reviews current methods and provides samples on how to create sustainable products. Various methods of achieving products with the least environmental impact are shown, as well as policies for product development with specialization in product selection, design, application in product and recycling. Their estimated values when organized according to the descending rows. Get Kevlar 49-epoxy FRP and S glass-epoxy FRP, first and second grades, respectively. Boron-epoxy FRP is the worst choice. Carbon-epoxy is considered FRP Having the minimum total deviation of all the pros and cons Would be the best alternative Fatigue limits, fracture stiffness and fragment strength are the criteria for benefit and price / mass is the ineffective criterion. Furthermore, the component is subjected to mechanical impacts and water spraying, resulting in high fracture stiffness and good corrosion resistance to the material. Therefore, from a safety point of view, the

piecemeal capacity of the flywheel material is an important property. Of these, fatigue range, fracture stiffness and fragmentation capacity are the criteria for benefit, and price / mass is the ineffective criterion.

TABLE 1 shows the Technique for Order of Preference by Similarity to Ideal Solution

	fatigue limit	fracture toughness	Fragment ability	Price/ mass
E glass–epoxy FRP	65.36	33.25	56.36	22.05
S glass–epoxy FRP	75.36	25.43	52.36	25.36
Carbon–epoxy FRP	55.36	33.58	75.36	21.36
Kevlar 29– epoxy FRP	42.36	42.15	55.36	33.69
Kevlar 49– epoxy FRP	65.36	44.36	58.36	25.36
Boron–epoxy FRP	61.36	46.36	45.4	22.44

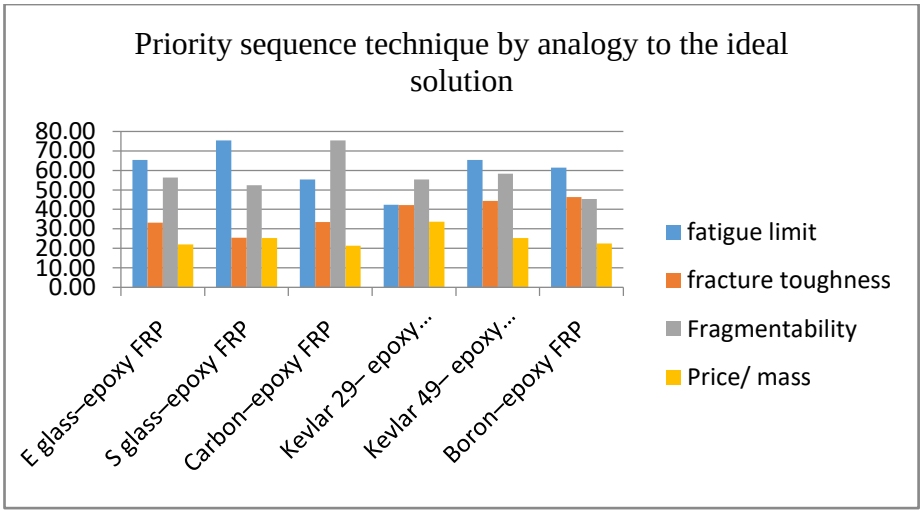

Figure 1. Technique for Order of Preference by Similarity to Ideal Solution

Figure 1 show the s glass is highest value in fatigue limit and boron is the lowest value boron is the highest value for fracture toughness and s glass is the lowest value. Carbon is the highest value for fragment ability and boron is the lowest value. Kevlar 29 is the highest value for price and carbon is lowest value. Table 1 show the s glass is highest value in fatigue limit and boron is the lowest value boron is the highest value for fracture toughness and s glass is the lowest value. Carbon is the highest value for fragment ability and boron is the lowest value. Kevlar 29 is the highest value for price and carbon is lowest value.

TABLE 2 shows the normalized data

	fatigue limit	fracture toughness	Fragment ability	Price/ mass
E glass–epoxy FRP	0.47315	0.241	0.419	0.38
S glass–epoxy FRP	0.545542	0.184	0.39	0.437
Carbon–epoxy FRP	0.400759	0.243	0.561	0.368
Kevlar 29– epoxy FRP	0.30665	0.305	0.412	0.581
Kevlar 49– epoxy FRP	0.47315	0.321	0.434	0.437
Boron–epoxy FRP	0.444194	0.336	0.337	0.387

Table 2 glass epoxy erp in the highest value for fatigue limit and lowest value for Kevlar 29 epoxy frp

TABLE3. Positive matrix and negative matrix

	Positive Matrix				Negative matrix			
E glass–epoxy FRP	0.136	0.08	0.14	0.092073	0.077	0.046023	0.097384	0.145221
S glass–epoxy FRP	0.136	0.08	0.14	0.092073	0.077	0.046023	0.097384	0.145221
Carbon–epoxy FRP	0.136	0.08	0.14	0.092073	0.077	0.046023	0.097384	0.145221
Kevlar 29– epoxy FRP	0.136	0.08	0.14	0.092073	0.077	0.046023	0.097384	0.145221
Kevlar 49– epoxy FRP	0.136	0.08	0.14	0.092073	0.077	0.046023	0.097384	0.145221
Boron–epoxy FRP	0.136	0.08	0.14	0.092073	0.077	0.046023	0.097384	0.145221

A table 3 show the value for all the alternatives are decreased in positive matrix and negative matrix is intercedes in the value.

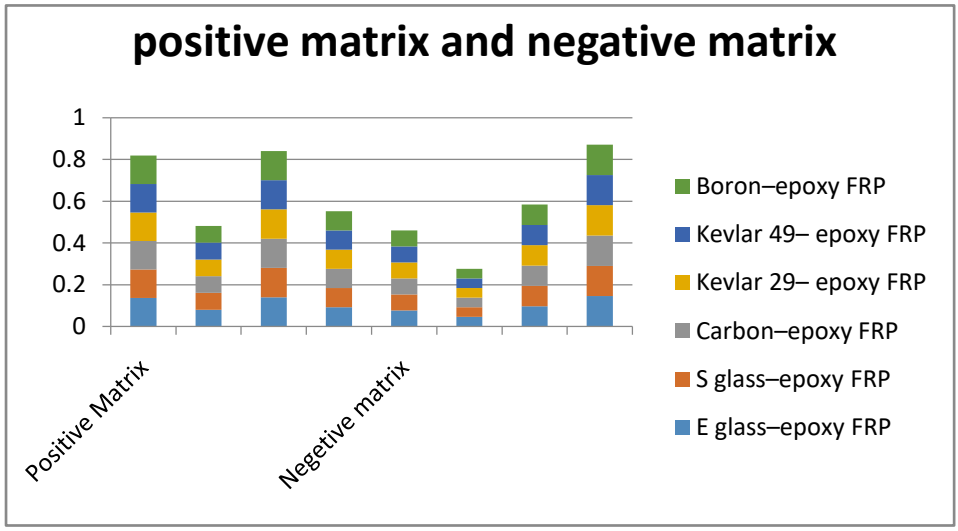

Figure 2. Positive Matrix and Negative Matrix

Figure 2 shows the value for all the alternatives are decreased in positive matrix. And negative matrix is intercedes in the value.

FIGURE 3. si plus and si negative and si value

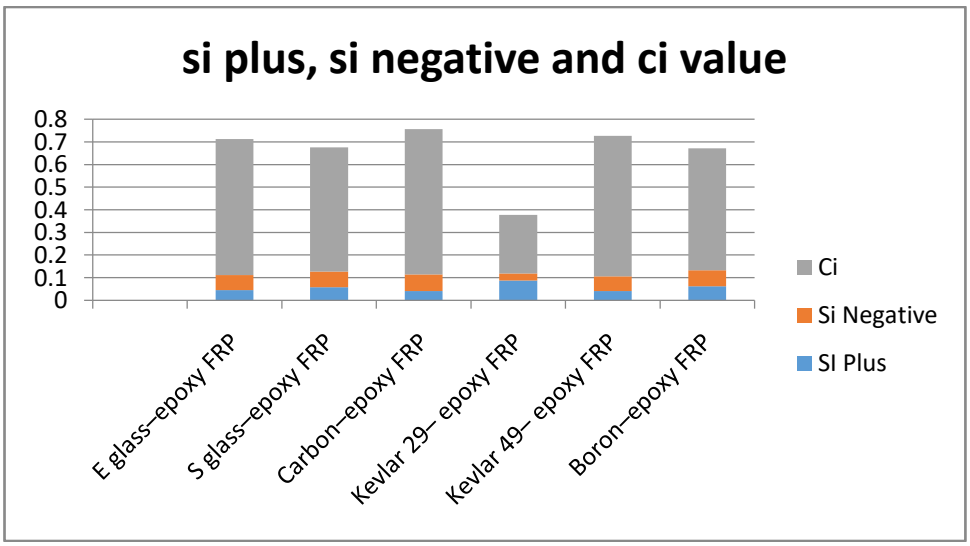

Figure 3 show the ci value for carbon is the highest value and lowest value for Kevlar 29.boron is the highest value for si negative and Kevlar is lowest value.kevlar29 is highest value in si plus and carbon is lowest value.

TABLE 4. si plus and si negative ci and Rank

	SI Plus	Si Negative	Ci	Rank
E glass–epoxy FRP	0.044603	0.067125	0.600789	3
S glass–epoxy FRP	0.057453	0.069686	0.548106	4
Carbon–epoxy FRP	0.041119	0.07366	0.641756	1
Kevlar 29– epoxy FRP	0.088268	0.03077	0.258487	6
Kevlar 49– epoxy FRP	0.040305	0.065728	0.619879	2
Boron–epoxy FRP	0.061563	0.071682	0.537971	5

Table 4 show the ci value for carbon is the highest value and lowest value for Kevlar 29.boron is the highest value for si negative and Kevlar is lowest value.kevlar29 is highest value in si plus and carbon is lowest value and final rank Carbon–epoxy FRP first rank and Kevlar 29– epoxy FRP is lowest rank.

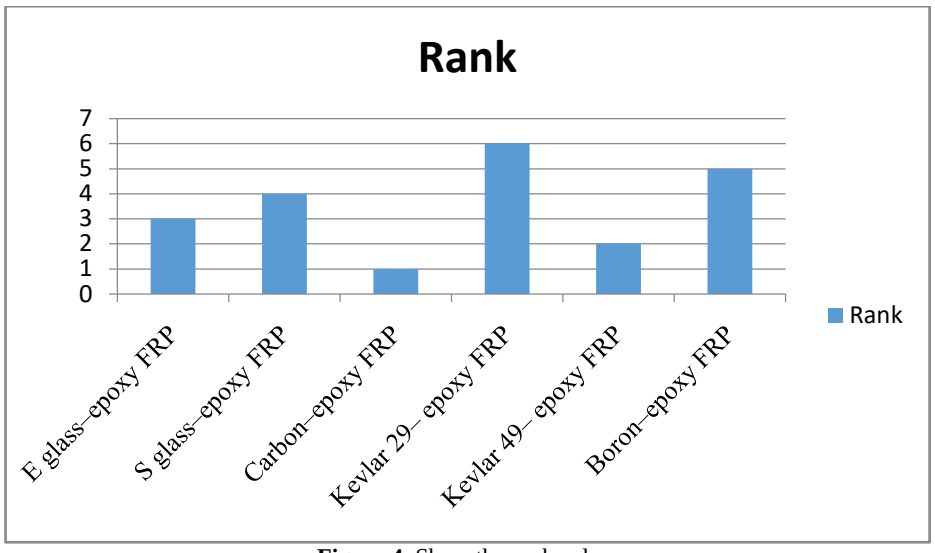

Figure 4. Show the rank value.

Figure 4 final rank is Carbon–epoxy FRP first rank and Kevlar 29– epoxy FRP is lowest rank.

4. Conclusion

Meanwhile, the PROMETHEE (Priority Rating System for Enrichment Ratings) system has attracted much attention from academics and coaches than the better methods and their applications. In this paper, PROMETHEE methods and to reveal current research on applications, to classify and interpret a classification scheme and detailed literature review are provided. Based on the plan, 217 intellectual documents from 100 journals application areas and are classified as non-application papers. Meanwhile, the advanced methods of the PROMETHEE (Priority Rating System for Enrichment Ratings) Family and their applications have attracted the attention of educators. In this paper, a classification plan and a detailed literature review are provided to identify, classify, and interpret current research on PROMETHEE methods and applications. Based on the project, 217 intellectual documents from 100 journals are classified as application areas and non-application documents.. Optimization theory is a branch of mathematics that is dedicated to solving optimization problems. Optimization problems are mathematical operations where we need to reduce or increase the functional value. These kinds of problems are found in abundance in computer science and applied mathematics. Their main features are simplicity, clarity and consistency. The concept of a common criterion is used to build a valuable relationship. Priority rating system (PROMETHEE) for enrichment assessment was used to solve the problem. The final rating is carbon-epoxy FRP first grade and Kevlar 29-epoxy FRP low rating.

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