

SHORT REVIEW ON THE POTENTIAL OF FIBER REINFORCED POLYMER (FRP) AS A NEW MATERIAL IN MAKING MONKEY TRAPS IN MALAYSIA

M.H. Che Pa¹, M. Mohamed², M.I. Ahmad³, H. Husain^{1,4},
A. Amir^{1,5} and K. Hambali^{1,5*}

¹Faculty of Earth Science, Universiti Malaysia Kelantan,
Jeli Campus, 17600 Jeli, Kelantan, Malaysia.

²Faculty of Data Science and Computing, Universiti Malaysia Kelantan,
City Campus, 16100, Kota Bharu, Kelantan, Malaysia.

³Faculty of Bioengineering and Technology, Universiti Malaysia Kelantan,
Jeli Campus, 17600 Jeli, Kelantan, Malaysia.

⁴Jabatan PERHILITAN Negeri Kelantan, Tingkat 12
Wisma Persekutuan, 15664 Kota Bharu, Kelantan, Malaysia.

⁵Animal and Wildlife Research Group, Faculty of Earth Science,
Universiti Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan, Malaysia.

*Corresponding Author's Email: kamarul@umk.edu.my

ABSTRACT: This abstract provides a short review on the potential of Fiber Reinforced Polymer (FRP) as a novel material for constructing monkey traps in Malaysia. Traditional traps often use materials prone to environmental degradation and require frequent replacement. FRP, with its lightweight, durable, and corrosion-resistant properties, presents a promising alternative. This review explores the feasibility of FRP traps in Malaysian settings, considering environmental factors, cost-effectiveness, and ease of fabrication. The study examines existing literature and experimental data to assess FRP's suitability for enhancing trap durability and efficacy. Insights gained from this review suggest FRP holds significant promise in modernizing monkey trapping methods in Malaysia, potentially offering sustainable solutions to traditional challenges.

KEYWORDS: *Fiber Reinforced Polymer; Monkey Trap Material; Design; Manufacturability; Malaysia.*

1.0 INTRODUCTION

In Malaysia, the management of human-wildlife interactions, particularly concerning monkeys, poses significant challenges. Traditional methods of trapping monkeys often involve materials that degrade quickly in the humid tropical environment, necessitating frequent maintenance and replacement. This issue has sparked interest in exploring alternative materials that can enhance the durability and effectiveness of traps. Fiber Reinforced Polymer (FRP) emerges as a promising candidate due to its robust mechanical properties, lightweight nature, and resistance to environmental factors such as moisture and corrosion.

FRP, composed of a polymer matrix reinforced with fibers such as glass, carbon, or aramid, has been widely adopted in various engineering applications worldwide [1-3]. Its utilization in constructing traps for wildlife management is relatively novel but offers several potential advantages. Unlike conventional materials like wood or metal, FRP exhibits high strength-to-weight ratio, making it easier to handle and transport while maintaining structural integrity over extended periods. This characteristic is particularly advantageous in Malaysia's diverse and often challenging terrains, where traps may be subjected to heavy rainfall, high humidity, and exposure to UV radiation.

Moreover, the longevity of FRP materials could significantly reduce the frequency of trap replacement, thereby lowering maintenance costs and labor requirements. This economic benefit is crucial for wildlife management initiatives operating under limited budgets. Furthermore, the inert nature of FRP minimizes the risk of environmental contamination, aligning with sustainable conservation practices [4]. Despite these potential advantages, the adaptation of FRP in monkey trap design requires careful consideration of factors such as local wildlife behavior, trap design optimization, and cost-effectiveness.

This review aims to explore the feasibility and potential applications of FRP in enhancing the efficacy of monkey traps in Malaysia. By synthesizing existing literature, evaluating experimental findings, and discussing practical considerations, this study seeks to provide insights into how FRP can contribute to modernizing wildlife management strategies while promoting sustainability in conservation efforts.

2.0 MONKEY TRAP

A monkey trap is a device designed to capture monkeys for various purposes, including wildlife management, research, and cultural practices. These traps typically exploit the natural behavior of monkeys, often targeting their curiosity and agility. The design and construction of monkey traps vary widely depending on their intended use and the species of monkey being targeted. Historically, monkey traps have been crafted from materials readily available in local environments. In some cultures, hollowed-out gourds or coconuts with narrow openings are used. Monkeys are attracted to the food placed inside but find it difficult to remove their clenched fists from the narrow opening when holding onto the bait. In contemporary contexts, monkey traps may incorporate more durable and sophisticated materials. Metal cages with trap doors controlled by a mechanism are common, allowing for the safe capture and subsequent release or transfer of captured monkeys.

Monkey traps serve several purposes. In agricultural regions, they are used to protect crops from foraging monkeys, minimizing human-wildlife conflict. In research, traps are employed to study behavior, health, and population dynamics of monkey species. Traps also play a role in wildlife conservation efforts, facilitating the relocation of problem monkeys or endangered species to protected habitats. The use of monkey traps raises ethical questions regarding animal welfare and the humane treatment of captured individuals. Researchers and conservationists strive to minimize stress and harm to monkeys through careful trap design, monitoring, and swift release protocols.

2.1 Type of Monkey Trap

In Malaysia, various types of monkey traps are utilized for managing human-wildlife interactions, conducting research, and addressing conservation challenges. These traps leverage the natural behaviors and characteristics of monkeys to achieve successful capture while minimizing harm and stress. Figure 1 shows the different types and designs of monkey traps commonly used in Malaysia. Type A and B traps are made of sheet steel without a roof and there is a small door for the transfer of trapped monkeys from the main trap to the carrier cage. The trap has an opening at the bottom that is covered with an iron net for inspection purposes. Type C and D traps are made of iron nets with iron pieces made into a funnel shape. Once the monkeys are trapped, they cannot escape due to the smooth surface of their funnels. The advantage of using type C and D traps is that it is easy to attract monkeys because the bait can be seen from a distance. Type E is made of wooden planks with an opening on the roof. Type F works as a carrier cage to transport monkeys from one place to another for a specific purpose [5].



Figure 1: Types of monkey traps commonly used in Malaysia [5]

3.0 FIBER REINFORCED POLYMER (FRP)

Fiber Reinforced Polymer (FRP) refers to a composite material consisting of a polymer matrix reinforced with fibers. This combination results in a material that harnesses the strength and stiffness of the fibers while utilizing the polymer matrix to hold them together and transfer stresses between them [6]. FRPs are designed to achieve superior mechanical properties compared to the individual components alone, making them suitable for a wide range of applications where high strength, low weight, corrosion resistance, and design flexibility are required [7].

Key components of FRP include; (i) Polymer Matrix: Typically epoxy, polyester, vinyl ester, or other resinous materials. The polymer matrix surrounds and binds the fibers together, providing protection from environmental factors and transferring loads between the fibers, and (ii) Reinforcing Fibers: Common fibers used include glass (GFRP), carbon (CFRP), aramid (AFRP), and basalt (Figure 2). These fibers contribute to the strength and stiffness of the composite material. The choice of fiber type depends on the specific application requirements, such as mechanical properties, cost considerations, and environmental conditions.

FRPs are known for their excellent strength-to-weight ratio, corrosion resistance, fatigue resistance, and design versatility. They are extensively used in industries such as construction (for bridges, buildings, and infrastructure) [8-10], aerospace (for aircraft components) [11,12], automotive (for lightweight parts) [13,14], marine (for boat hulls and offshore structures) [15,16], and sports/recreation (for equipment like tennis rackets and bicycles) [17-19]. Overall, FRPs represent a significant advancement in materials technology, offering solutions that meet demanding performance criteria across various sectors.



Figure 2: Four types of FRP commonly used [20]

4.0 FUTURE POTENTIAL AND CONCLUSION

Advances in materials science, such as the use of Fiber Reinforced Polymer (FRP), offer potential improvements in trap design. FRP traps could enhance durability, reduce maintenance needs, and improve efficacy under diverse environmental conditions, as explored in studies on new materials for monkey traps in Malaysia and other regions. In conclusion, monkey traps are practical tools used globally for managing human-wildlife interactions, conducting research, and supporting conservation efforts. Their design and material composition continue to evolve, reflecting advancements in wildlife management practices and sustainability goals.

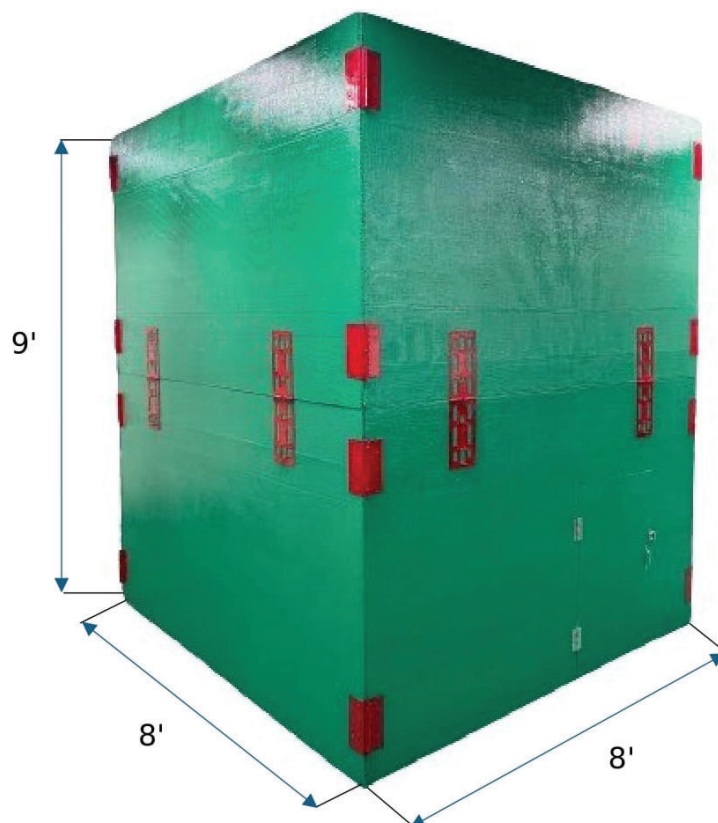


Figure 3: Proposed future prototype of monkey trap using Fiber Reinforced Polymer (FRP)

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