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WELCOME SPEECH FROM THE CHAIRMAN

RISM 17th International Surveying Conference for Undergraduates (ISCU 2025)

بسم الله الرحمن الرحيم السلام

عليكم ورحمة الله وبركاته

Greetings to all,

It is with great pleasure that I welcome you to the 17th RISM International Surveying Conference for Undergraduates (ISCU 2025), themed *"Embracing Construction Revolution 4.0: Transforming Malaysia's Built Environment."* On behalf of the Royal Institution of Surveyors Malaysia (RISM), I also wish to express our sincere appreciation to Universiti Teknologi MARA (UiTM), Perak Campus, for graciously hosting this significant event.

As we navigate the era of the Fourth Industrial Revolution (IR4.0)—or in our context, Construction Revolution 4.0 (CR4.0)—we are witnessing transformative advancements across the global construction sector. Technologies such as Building Information Modelling (BIM), the Internet of Things (IoT), artificial intelligence (AI), robotics, big data analytics, and cloud computing are redefining the way we build, manage, and interact with our built environment. For Malaysia, embracing CR4.0 is a strategic imperative to achieve our socio-economic and environmental goals.

This conference serves as a vital platform to unite surveying undergraduates from various disciplines, fostering critical dialogue on industry challenges, enhancing professional networking, and preparing a new generation of talent for the rapidly evolving construction landscape. It is also an opportunity for employers to engage with and inspire our future professionals.

I would like to extend my heartfelt thanks to all industry speakers, paper presenters, judges, and participants for their time, contributions, and support in making ISCU 2025 a success. I also commend the organising committee for curating a meaningful and dynamic conference experience.

May the knowledge gained, connections formed, and ideas exchanged during this event inspire all participants to lead and innovate in their future endeavours.

Wishing everyone a productive and memorable conference.

Prof. Ts Sr Dr. Adi Irfan Bin Che Ani'
Chairman, Universities' Partnering Committee
RISM Session 2024/2025
May 2025

WELCOME SPEECH FROM CO-CHAIRMAN

RISM 17th International Surveying Conference for Undergraduates (ISCU 2025)

Bismillahirrahmanirrahim.

السلام عليكم ورحمة الله وبركاته and greetings to all.

It is my great pleasure to welcome everyone to the 17th International Surveyor Conference for Undergraduates (ISCU 2025), proudly hosted by Universiti Teknologi MARA (UiTM) Perak Branch in collaboration with the Royal Institution of Surveyors Malaysia (RISM). This event is a meaningful platform for students in the built environment to share ideas, showcase innovations, and build professional networks. We are honoured by your presence and enthusiastic participation, with 135 accepted papers and 78 poster presentations this year.

UiTM Perak, home to the College of Built Environment, has long been a hub for academic excellence in architecture, planning, and surveying. Our commitment remains strong in nurturing competent graduates who meet industry demands and contribute to nation-building.

While you're here, we invite you to experience the heritage and culture of Perak Tengah from the architectural richness of Rumah Kutai to the historical towns of Pasir Salak, Bota, and Kampung Gajah.

To all presenters and winners, congratulations on your achievements. Let your work today be a catalyst for future success and academic growth. We hope this conference will inspire you to explore new ideas, foster collaboration, and make lasting memories.

My deepest thanks to the Royal Institution of Surveyors Malaysia (RISM) and the organising committee for making this event a success.

We hope your experience here will be rewarding and unforgettable.

Thank you. Selamat datang dan selamat berjaya.

Associates Professor Dr. Nur Hisham Ibrahim, *PMP*
Co-Chairman, Universities' Partnering Committee
RISM Session 2024/2025
May 2025

WELCOME SPEECH FROM THE PROJECT DIRECTOR

RISM 17th International Surveying Conference for Undergraduates 2025

Alhamdulillah, all praise to Allah S.W.T. for His guidance and blessings in making the RISM 17th International Surveying Conference for Undergraduates (ISCU) 2025 a reality.

It is with great honour and gratitude that I welcome all participants, guests, academicians, and industry professionals to this prestigious event, proudly organized under the Royal Institution of Surveyors Malaysia (RISM). This 17th edition of ISCU stands as a proud testament to our collective dedication toward academic excellence, professional collaboration, and youth empowerment in the field of surveying.

I extend my heartfelt appreciation to RISM for its unwavering support, to the hardworking ISCU 2025 Organising Committee, and to all 16 partnering universities across Malaysia for their commitment and contributions. Your efforts have shaped this conference into a dynamic platform for knowledge exchange, innovation, and professional growth.

To the academicians and practitioners present, your insights are invaluable in bridging the gap between academic theory and real-world practice. To our undergraduate participants, your passion, curiosity, and commitment are the very foundation of our future. May this conference not only deepen your academic journey but also ignite a spirit of leadership, integrity, and sustainable thinking.

Let this gathering serve as more than an academic milestone. May it foster lifelong networks, inspire transformative ideas, and chart new directions in our shared professional journey.

Wishing everyone a rewarding and inspiring conference experience.

Sr Dr. Nurul Fadzila Zahari
Project Director
RISM 17th ISCU 2025

REDUCING PLASTIC WASTE PROBLEM WITH ECO PLASTIC PAVEMENT BLOCK

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ABSTRACT

The global plastic pollution crisis is worsening, with plastic waste projected to reach 220.6 million kilotons in 2024 and 1,100 million metric tons annually by 2050 if current trends persist. Despite advancements in waste management, mismanaged plastic waste remains a major issue, underscoring the need for sustainable solutions. Simultaneously, the construction industry faces rising material costs and high carbon emissions, particularly from cement production, which contributed 2,794 thousand tons of CO_2 emissions in Malaysia in 2024. Cement remains a significant source of embodied carbon in construction, necessitating alternative materials to mitigate environmental impact. This study investigates the feasibility of utilizing recycled plastic waste in pavement block production as a sustainable alternative to traditional concrete blocks. By repurposing plastic waste to replace cement, this approach could reduce plastic pollution while meeting Malaysia's increasing demand for paving materials. The Malaysian paving block market is expected to grow at a 4.7% CAGR from 2020 to 2026, driven by urbanization and sustainability initiatives. Recycled plastic paving blocks offer advantages such as improved durability, cost-effectiveness, and lower carbon emissions. The research objectives include assessing the benefits and impacts of eco-plastic pavement blocks, determining the optimal material composition, and evaluating their performance against conventional concrete blocks. The methodology involves material testing to identify the ideal mix of recycled plastic and binding agents, followed by compressive strength, flexural strength and water absorption. Comparative analyses will determine their viability as a sustainable construction material. Anticipated outcomes include an optimized material composition that minimizes plastic waste and embodied carbon while maintaining or surpassing conventional block performance. This research aims to provide a scalable, eco-friendly solution to Malaysia's plastic waste crisis while promoting sustainability in the construction industry.

Keywords: Embodied Carbon, Pavement Blocks, Plastic Pollution, Recycled Plastic, Sustainable Construction

I. INTRODUCTION

Plastic, a versatile and cost-effective material, has become a cornerstone of modern life, revolutionizing industries across the globe. However, the overproduction and excessive use of plastic have led to an alarming waste crisis, with plastic pollution now one of the most pressing environmental challenges. Global plastic waste generation is projected to reach 220 million tons by 2024, with a significant portion mismanaged, contributing to widespread environmental damage (SFAE, 2024). Plastic's non-biodegradable nature results in its persistence in the environment for centuries, posing severe risks to human health, wildlife, and ecosystems (Evode et al., 2021).

The construction industry has emerged as a potential solution to mitigate plastic waste by repurposing plastic materials into construction products such as paving blocks (Karisma et al., 2023). This approach not only reduces the burden of plastic waste but also lowers carbon emissions by reducing the need for conventional raw materials like cement and sand (Rachmawati et al., 2022; Karisma et al., 2023). Malaysia, a major plastic producer and importer, faces significant waste management challenges, further compounded by illegal recycling practices and low recycling rates (Greenpeace Malaysia, 2024; Kabilan, 2024; Serbajadi, 2022). Using plastic waste in paving block production offers a sustainable alternative, addressing both plastic waste and the environmental concerns associated with traditional construction materials (Karisma et al., 2023). This research explores the potential of using plastic waste as a cement substitute in paving blocks. The study examines the technical feasibility, environmental benefits of such materials, aiming to contribute to sustainable waste management and support the construction industry's efforts to combat the global plastic pollution crisis.

A. Problem Statement

Malaysia's construction industry faces significant environmental challenges, primarily due to the high carbon emissions from cement production, which is a major contributor to the nation's carbon footprint. Cement production reached 2,794 thousand tonnes in November 2024, with a rising trend driven by urbanization and industrialization (Trading Economics, 2024). The cement industry is responsible for approximately 25 kg of CO_2 equivalent per kilogram of cement, making it the third-largest contributor to embodied carbon emissions in construction (CIDB, 2022). The increasing demand for construction materials, along with rising costs, exacerbates the environmental and economic impact (Kamaruddin, 2024).

Simultaneously, Malaysia is grappling with a plastic pollution crisis, as it is a leading producer and importer of plastic waste. This dual challenge of high cement-related carbon emissions and widespread plastic waste calls for innovative solutions. One promising approach is incorporating recycled plastic waste into construction materials, such as paving blocks, which can help reduce both plastic pollution and the carbon footprint of traditional materials (Karisma et al., 2023). The market for paving blocks is expected to grow and recycled plastic paving blocks could meet the increasing demand for sustainable materials (Wresearch, 2024). However, the adoption of recycled plastic paving blocks is still in the early stages, with challenges related to large-scale production, engineering properties, long-term sustainability, and public awareness (Karisma et al., 2023; Rachmawati et al., 2022).

B. Aim and Objectives

The aim of this research is to explore the feasibility of recycled plastic pavement blocks as a sustainable alternative to traditional cement-based paving materials, focusing on their environmental, economic, and performance benefits. More specifically the objectives of the study are:

i. To identify the benefits and impact of eco plastic pavement blocks.
ii. To explore the potential material compositions and their theoretical feasibility in reducing plastic pollution and carbon emissions.
iii. To recommend optimum eco plastic pavement blocks based on their performance compared to traditional concrete blocks.

II. LITERATURE REVIEW

A. Plastic Waste Management in Malaysia

Malaysia plays a significant role in the global plastic waste crisis, ranking 30th out of 61 countries in plastic waste generation (Sarah Perreard, 2024). While it does not generate the highest amount of plastic waste per capita, it is a major importer of plastic waste, with countries like the United States, Germany, Japan, and New Zealand contributing large amounts. In 2023, Malaysia imported over 100,000 metric tons of plastic waste from the U.S. alone (Chen et al., 2024). This influx of imported plastic waste has overwhelmed Malaysia's waste management systems, presenting both environmental and economic challenges. The country faces rising concerns over its role as a plastic waste dumping ground and the strain it puts on its recycling infrastructure (Gomes, 2025). However, plastic recycling has been proposed as a key strategy to mitigate both the environmental damage caused by plastic pollution and the burden on waste management systems.

B Cement Production and Carbon Emissions

The cement industry is one of Malaysia's largest contributors to carbon emissions. Cement production in Malaysia is responsible for significant CO_2 emissions, with 25 kg of CO_2 per kilogram of cement produced, contributing substantially to embodied carbon in construction (CIDB, 2022). The demand for cement is growing rapidly due to urbanization and industrialization, further increasing its carbon footprint (Trading Economics, 2024). With the construction sector expanding, Malaysia faces the challenge of reducing carbon emissions while meeting the rising demand for building materials.

I. Benefits of Recycled Plastic in Construction

The economic benefits of using recycled plastic in construction are compelling. Recycled plastics are often less expensive than virgin materials, offering substantial cost reductions in the production of paving blocks (Iftikhar et al., 2024). Moreover, plastic waste is a readily available and low-cost raw material for construction compared to imported cement (Karisma et al., 2023). This can significantly reduce material costs in the construction industry, especially in regions where cement costs are rising due to global supply chain challenges. The integration of recycled plastics into construction also provides an opportunity to stimulate local recycling industries, create green jobs, and reduce the economic burden on waste management systems (Kamaruddin, 2024). Recycling plastics for construction materials promotes a circular economy, which can lead to long-term economic sustainability by reducing the reliance on virgin materials and minimizing waste disposal costs (Gomes, 2025).

II. Paving Block

Pavement blocks, also known as pavement blocks or pavement blocks, are modular units made from materials like concrete, clay, or stone, designed for use in creating paved surfaces. These blocks are widely used in outdoor construction for applications such as walkways, driveways, patios, and road pavements due to their durability, aesthetic appeal, and ease of installation. Paving blocks are typically manufactured through molding processes, ensuring uniformity and strength. The most common type of paving block is made from concrete, which can be molded into various shapes and sizes. These blocks are designed to interlock, creating a stable and durable surface that resists shifting or displacement (Asmitarealty, 2024). Other types, such as clay and stone blocks, are used for decorative purposes due to their natural aesthetic and unique color variations but may be less suited for high-traffic areas compared to concrete blocks (Asmitarealty, 2024).

i) Eco Pavement Blocks

The adoption of sustainable and environmentally conscious construction practices has become increasingly important in recent years, driven by concerns over sustainability and the need to reduce greenhouse gas emissions. One innovative approach is eco-paving, which incorporates environmentally friendly materials to minimize the carbon footprint of construction activities (Rubber, 2023). This method is used to build roads, pavements, and pathways with materials that are both sustainable and eco-friendly. Eco-paving utilizes a variety of materials, including recycled options such as tires, fly ash, porcelain and plastics, as well as natural resources like gravel, sand, and crushed stone. These materials are selected for their low environmental impact and high durability, ensuring that the construction process aligns with sustainability goals (Rubber, 2023).

ii) Eco Plastic Pavement Blocks

Eco-plastic pavement blocks are an innovative and sustainable alternative to traditional paving materials. Made from a combination of recycled plastic waste and sand, these blocks address two significant environmental challenges: plastic pollution and the reliance on carbon-intensive materials like cement (Asif & Javed, 2024). They are versatile and suitable for various applications, such as pedestrian pathways, landscaping, and light-traffic roads, offering a practical solution for sustainable construction (Yeo et al., 2021).

iii) Chemical Composition of Plastics and Their Role in Replacing Cement

The chemical composition of plastics, primarily made from hydrocarbons, stabilizers, and additives such as polyethylene (PE), high density polyethylene (HDPE), low density polyethylene (LDPE) polypropylene (PP), and polyethylene terephthalate (PET), plays a key role in their potential for replacing cement in paving blocks (Iftikhar et al., 2024; Gungat et al., 2021). The use of recycled plastics, such as LDPE, PET, and HDPE, in paving blocks can help reduce the environmental impact of cement production, which is a major source of CO_2 emissions. Plastics' non-hydrophilic nature, flexibility, and ability to form a cohesive matrix with sand and aggregates make them a viable substitute for traditional binders in non-load-bearing applications like pedestrian pathways. (Gungat et al., 2021; Karisma et al., 2023). Research shows that plastics can replace cement while maintaining adequate strength, although challenges like optimizing mix designs and addressing porosity must be addressed. Studies using techniques like X-ray diffraction (XRD) and scanning electron microscopy (SEM) have provided insights into the interaction of plastics with other materials, helping to refine the mix and improve performance (Iftikhar et al., 2024; Gungat et al., 2021; Kuekham et al., 2024).

III. Material Compositions in Eco-Plastic Pavement Blocks

Common recycled plastics used in eco-plastic pavement blocks include PET (Polyethylene Terephthalate), HDPE (High-Density Polyethylene), and LDPE (Low-Density Polyethylene). These materials are chosen for their flexibility, strength, and binding properties when mixed with aggregates like sand (Gungat et al., 2021). Studies have shown that PET and HDPE offer particularly strong performance when used as binding agents in paving blocks, enhancing their durability and mechanical properties (Iftikhar et al., 2024). The physical properties of these plastics, such as high tensile strength, flexibility, and resistance to water, make them viable alternatives to cement in non-load-bearing applications like pavements (Gungat et al., 2021). Recycled plastics can replace conventional aggregates and binders in construction materials, offering a potential solution to plastic waste management and carbon emission reduction (Karisma et al., 2023).

i) Feasibility in Reducing Plastic Pollution and Carbon Emissions

Recycled plastic used in construction materials provides a sustainable solution to the plastic waste problem, diverting significant amounts of plastic from landfills and incineration. Plastic waste that would otherwise contribute to land and marine pollution can be repurposed into durable paving blocks, helping to mitigate the environmental harm caused by plastic waste (Rachmawati et al., 2022). This aligns with global efforts to address plastic pollution by integrating waste into useful products. Replacing cement with recycled plastics can significantly lower the carbon footprint of paving blocks. Cement production is responsible for about 8% of global CO_2 emissions, while recycled plastics have a much lower environmental impact (Rachmawati et al., 2022). By using recycled plastics, the embodied carbon of paving blocks is reduced, offering a more sustainable and eco-friendly alternative (Gungat et al., 2021).

IV. Performance Comparison of Eco Plastic and Concrete Paving Blocks

The performance of eco-plastic paving blocks compared to traditional concrete blocks has been studied extensively, with mixed results. Compressive strength, abrasion resistance, water absorption, and flexibility are critical factors when evaluating the suitability of these materials for different construction applications. Concrete blocks generally offer higher compressive strength, making them ideal for heavy-load and high-traffic areas like highways, parking lots, and commercial buildings (Iftikhar et al., 2024; Karisma et al., 2023). In contrast, eco-plastic blocks are generally suited for non-load-bearing applications like pedestrian pathways and landscaping (Gungat et al., 2021). Studies have shown that PET-based blocks offer adequate strength for light to moderate traffic, but they fall short of meeting the 50 MPa strength requirement for high-traffic areas (Karisma et al., 2023). HDPE-based blocks offer better flexibility and impact resistance, making them well-suited for environments where the paving surface might undergo slight shifts or impacts, but their compressive strength remains lower compared to conventional concrete blocks (Iftikhar et al., 2024). Both PET and HDPE exhibit better water resistance compared to concrete, which helps mitigate issues like moss growth and surface degradation in wet climates.While eco-plastic blocks have shown promising results in terms of water absorption and impact resistance, abrasion resistance continues to be a limitation. Research indicates that eco-plastic blocks, especially those with higher plastic content, exhibit increased water absorption and reduced abrasion resistance, which can impact their long-term durability (Karisma et al., 2023). However, the addition of coarse aggregates in the mix, which is a relatively unexplored area in existing research, could potentially enhance the strength and abrasion resistance of eco-plastic blocks (Bachok et al., 2020).

V. Conclusion and Justification for New Research

In this study, the performance of eco-plastic blocks will be evaluated using different ratios of PET (Polyethylene Terephthalate) and sand, as well as PET, sand, and coarse aggregates. Additionally, HDPE (High-Density Polyethylene) will be tested with varying ratios of sand and coarse aggregates. These materials will be tested in machines to measure compressive strength, abrasion resistance, and water absorption, providing valuable insights into their potential performance for use in construction applications. While most existing research on eco-plastic blocks has focused primarily on sand-based mixtures, there has been limited exploration of the impact of coarse aggregates on strength and abrasion resistance. Incorporating coarse aggregates could significantly enhance the overall performance of eco-plastic blocks, especially for high-traffic applications, where higher strength and durability are required. This new research will investigate the combination of plastics with sand and coarse aggregates, aiming to optimize the performance of the blocks for a wider range of construction applications, particularly those that require higher strength.

Furthermore, previous studies have largely examined single plastic types (either PET or HDPE) in various ratios with sand. However, the combination of PET and HDPE in different proportions, along with the addition of coarse aggregates, has not been extensively studied. This research will fill this gap by determining the optimal ratio of PET and HDPE with sand and coarse aggregates to achieve the best balance between compressive strength, abrasion resistance, durability, and cost-effectiveness. The findings from this study are expected to lead to the development of eco-plastic paving blocks with higher strength and enhanced performance, making them more suitable for heavy-duty and high-traffic construction applications.

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III. RESEARCH METHODOLOGY

B. Research Design

The research design for this study follows a mixed-methods approach, combining both qualitative and quantitative methodologies to ensure comprehensive and reliable results. The design is structured to meet the research objectives in a step-by-step process, beginning with literature review and culminating in experimental testing of eco-plastic pavement blocks. This methodology is structured to address the three main objectives: (1) identifying the benefits and impact of eco-plastic pavement blocks, (2) exploring the potential material compositions for reducing plastic pollution and carbon emissions, and (3) recommending the most effective eco-plastic pavement blocks based on performance compared to traditional concrete blocks. By employing both secondary research and primary data collection through testing, the study ensures a robust exploration of eco-plastic blocks.

C. Material Collection and Preparation

The production of eco-plastic pavement blocks begins with the collection of PET and HDPE plastic resins from recycling companies. The second key component is the collection of fine sand and coarse aggregates (such as basalt gravel with a size range of 5mm to 10mm, which is sieved). These aggregates provide the necessary strength and durability for the blocks. Both materials are sourced locally and cleaned to ensure they are contaminant-free. Once the materials are prepared, the plastic is melted at specific temperatures: PET has a melting point of 248–250°C, while HDPE melts at 134°C. The melted plastic is then mixed with the aggregates in specific ratios to form a homogeneous mixture, which is ready for molding into paving blocks. Please refer to the attached picture below for the material details and ratios used in the process.

Figure 3.1 Material used in the study
Source: Fieldwork, 2025

D. Production of Eco-Plastic Pavement Blocks

i) Mixing Process

The production of the eco-plastic blocks begins with mixing the molten plastic with fine sand and coarse aggregates. The mix ratios vary depending on the test group, including the following:

- PET + Sand (1:1), (1:2), (1:3)
- PET + Sand + Coarse Aggregate (1:1:2), (1:1:3)
- HDPE + Sand (1:1), (1:2), (1:3)
- HDPE + Sand + Coarse Aggregate (1:1:2), (1:1:3)

These combinations ensure that the test samples include varying proportions of plastic, sand, and coarse aggregate to assess how these ratios affect the performance of the eco-plastic blocks. The materials are mixed thoroughly to ensure an even distribution of plastic and aggregates.

ii) Molding and Cooling

Once the material are properly mixed, the molten mixture is poured into molds of standard size and shape:

- Prism molds (40 x 40 x 160 mm) for testing compression and abrasion resistance.
- Cube molds (50 x 50 x 50 mm) for testing water absorption.

After the molding process, the blocks are allowed to cool at room temperature for 24 hours to ensure proper solidification and minimize defects in the structure of the blocks.

iii) Curing Process

Following the molding and cooling, the blocks undergo a 28-day curing period. This curing process allows the blocks to achieve their maximum strength and durability. The blocks are stored in a humidity-controlled environment to ensure consistent curing conditions, but they are kept at room temperature (not immersed in water). This controlled environment helps the blocks maintain optimal conditions for uniform hardening throughout the curing period.

E. Testing of Eco Plastic Blocks

The compressive strength test will evaluate how well the blocks can withstand the pressure applied to them before failure. This test is critical for determining the suitability of eco-plastic blocks for heavy-duty applications, such as vehicular roadways. The testing will follow the MS EN 1338:2022 and ASTM C936/C936M-21 standards. According to MS EN 1338, blocks should have a minimum thickness of ≥60 mm, while ASTM C936 specifies a minimum of 60 mm (2.36 in.). The tensile splitting strength is also measured, with MS EN 1338 requiring ≥3.6 MPa and ASTM C936 requiring ≥8000 psi.

For water absorption testing, the blocks will be assessed for their ability to resist moisture infiltration, which is important for outdoor applications. MS EN 1338 specifies that Class 2 blocks should have water absorption ≤6% by mass, while ASTM C936 requires the average water absorption to be ≤5%, with individual blocks having ≤7%. The abrasion resistance test will evaluate how well the blocks resist wear and tear over time. This is particularly relevant for areas exposed to high-traffic conditions where friction could degrade the material. MS EN 1338 specifies that blocks should meet Class 3 (<23 mm loss) or Class 4 (<20 mm loss) abrasion resistance. ASTM C936 defines the acceptable limits for volume loss as ≤0.92 in^3/7.75 in^2 and thickness loss as ≤0.118 in. (3 mm). These tests will help determine the suitability of eco-plastic blocks for long-term use in various construction applications.

F. Data Analysis

The data collected from the tests will be analyzed using descriptive statistics to compare key performance metrics such as compressive strength, abrasion resistance, and water absorption across different mix ratios of PET and HDPE. Inferential statistics will be applied to determine if there are significant differences in performance between different material compositions. Additionally, the results will be compared to traditional concrete blocks to evaluate the feasibility of eco-plastic blocks as a sustainable alternative for pavement applications.

IV. EXPECTED FINDINGS AND CONCLUSION

The expected findings of this study suggest that the eco-plastic pavement blocks will demonstrate enhanced performance in line with previous research while meeting or exceeding the required compressive strength standards. Based on prior studies, it is anticipated that the optimal combination of PET and HDPE with sand and coarse aggregates will result in higher compressive strength and abrasion resistance compared to earlier formulations. Specifically, the use of coarse aggregates is expected to improve the blocks' durability, addressing the abrasion resistance issues identified in previous research. The water absorption levels are also expected to meet the standard requirements for paving blocks, offering adequate resistance to moisture infiltration. Moreover, the results are anticipated to align with or surpass the strength targets set by industry standards (e.g., MS EN 1338:2022 and ASTM C936/C936M-21), confirming that these eco-plastic blocks can be used effectively in construction applications, with high strength and long-term sustainability. The research is also expected to demonstrate the economic viability of using recycled plastic in paving blocks, providing a cost-effective, environmentally sustainable alternative to traditional materials. This study aims to fill gaps in existing research by exploring the optimal mix ratios and adding coarse aggregates, thus paving the way for scalable production and widespread adoption of eco-plastic paving blocks in construction.

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