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Experimental Study on Strength Characteristics of Chicken Mesh Reinforced Paver Blocks – A Comprehensive Review

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Abstract- Concrete paver blocks are widely used in pavement construction due to their durability, cost-effectiveness, ease of installation, and aesthetic appearance. With the rapid growth of urban infrastructure and increasing traffic loads, there is a growing demand for high-performance paving materials with improved strength and durability. In recent years, several researchers have focused on enhancing the performance of paver blocks through the incorporation of fibers, industrial waste materials, and innovative mix design techniques. In this paper, a comprehensive and detailed review of previously published research articles has been carried out to understand the current developments in the field of concrete paver blocks. The review covers various aspects such as the use of coconut fiber, plastic waste, fly ash, construction and demolition waste, polyester fiber, polypropylene fiber, and recycled aggregates in improving the mechanical and durability properties of paver blocks. The findings of the reviewed studies indicate that while these materials improve compressive strength, toughness, and sustainability, the problem of low tensile strength and crack propagation in concrete remains a major concern. Furthermore, most of the existing research focuses on material replacement and fiber reinforcement, whereas very limited attention has been given to mesh-based reinforcement techniques. Based on the critical analysis of previous studies, several research gaps have been identified, particularly the lack of studies on low-cost and practical reinforcement methods such as chicken mesh. Therefore, this review highlights the need for further investigation into chicken mesh reinforced paver blocks as a potential solution for improving strength, crack resistance, and overall performance.

Keywords- Concrete Paver Blocks, Chicken Mesh Reinforcement, Fiber Reinforcement, Sustainable Materials, Compressive Strength, Flexural Strength, Crack Resistance, Interlocking Pavement.

I. INTRODUCTION

Concrete paver blocks have emerged as one of the most widely used and effective pavement materials in modern construction due to their versatility, durability, ease of installation, and aesthetic appeal. These blocks are extensively used in a variety of applications such as pedestrian walkways, parking areas, residential streets, industrial pavements, bus terminals, and urban infrastructure projects, where both functional performance and visual appearance are important considerations. Unlike conventional rigid pavements made of cement concrete and flexible pavements made of bituminous materials, interlocking concrete paver blocks offer several distinct advantages, including better load distribution through interlocking action, ease of maintenance and replacement, improved skid resistance, and enhanced drainage characteristics. The increasing rate of urbanization, population growth, and vehicular traffic has led to a rising demand for durable, cost-effective, and sustainable pavement solutions, thereby promoting the widespread adoption of paver blocks in both developed and developing countries. Despite their numerous advantages, conventional concrete paver blocks are inherently brittle in nature and possess relatively low tensile strength, which makes them susceptible to cracking under repeated loading, impact forces, and environmental variations such as temperature changes and moisture fluctuations. This limitation significantly affects the long-term durability and service life of paver block pavements, especially in areas subjected to medium to heavy traffic conditions.

To address these challenges, researchers have explored various methods to enhance the mechanical and durability properties of paver blocks, including the incorporation of natural fibers such as coconut fiber, synthetic fibers such as nylon and polypropylene, and the use of industrial and agricultural waste materials such as fly ash, plastic waste, construction and demolition waste, and recycled aggregates. These approaches have shown considerable improvement in compressive strength, toughness, and sustainability, while also contributing to waste management and environmental protection. In addition to material-based improvements, several studies have also focused on optimizing design parameters such as block shape, thickness, joint width, bedding layer thickness, and interlocking mechanism, which play a crucial role in load transfer and overall pavement performance. Furthermore, the development of permeable and porous paver blocks has gained significant attention due to their ability to reduce surface runoff, enhance groundwater recharge, and mitigate urban flooding problems. However, despite these advancements, most of the existing research has primarily concentrated on improving compressive strength and sustainability aspects, while relatively less attention has been given to enhancing tensile strength, crack resistance, and overall structural behavior of individual paver blocks.

Another important limitation observed in the literature is that many reinforcement techniques, particularly fiber reinforcement, involve higher cost, specialized processing, and technical complexity, which may not be feasible for large-scale or rural construction applications. Moreover, the use of waste materials, although beneficial from an environmental perspective, does not always directly address the issue of crack propagation and tensile weakness in concrete. In this context, there is a growing need to explore alternative reinforcement techniques that are not only effective in improving mechanical performance but also economical, simple, and practical for real-world applications. One such promising approach is the use of mesh-type reinforcement, particularly chicken mesh, which has been successfully used in ferrocement structures to enhance tensile strength, ductility, and crack resistance. However, its application in concrete paver blocks remains largely unexplored.

Therefore, in this paper, a comprehensive review of previously published research articles has been carried out to understand the current state of knowledge in the field of concrete paver blocks, including material innovations, reinforcement techniques, and performance characteristics. Based on this detailed review, significant research gaps have been identified, particularly in the area of low-cost and practical reinforcement methods such as chicken mesh. The identification of these gaps forms the basis for the present study, which aims to investigate the strength characteristics and performance of chicken mesh reinforced paver blocks as a potential solution for improving durability and structural efficiency in pavement applications.

II. LITERATURE REVIEW

The present study focuses on filling this research gap by investigating the strength characteristics of chicken mesh reinforced paver blocks through experimental analysis. The results of this study will contribute to the development of cost-effective and durable paver blocks for practical applications.

[1] Evaluation of Interlocking Block Pavement Performance under Varying Construction Conditions by Model Chamber Tests (2025) By Inhyun Kim, Choong-Ki Chung, and Jung-Hyun Ryu- carried out an experimental investigation to evaluate the performance of Interlocking Block Pavements (IBPs) under different construction conditions using model chamber tests and repeated loading experiments. The study emphasized that with the increasing demand for interlocking block pavements to withstand different traffic loads, it is essential to understand how construction factors such as block thickness, joint width, and bedding sand thickness influence the overall pavement behavior. In this research, repeated loading tests were performed on model IBPs using different combinations of bedding thickness and joint width. For 100 mm thick general blocks, bedding thicknesses of 30 mm, 50 mm, and 80 mm were tested along with joint widths of 5 mm and 8 mm, while for 160 mm thick heavy-duty blocks, bedding thicknesses of 50 mm, 80 mm, and 110 mm were examined with a constant joint width of 5 mm. The pavement performance was evaluated based on key parameters such as deflection resistance, load dispersion ability, and interlocking effect, where interlocking effect was assessed through the relative deflection between adjacent blocks, which plays an important role in resisting traffic loads. The findings of the study revealed that the optimal interlocking performance for general blocks was achieved when the bedding thickness was 50 mm and joint width was 5 mm, resulting in improved load distribution and enhanced pavement stiffness.

[2] Utilization of Coconut Fibre Waste in Manufacturing of Paver Blocks (2024) By Dr. P. Saravana Kumar, Mr. K. Vallarasu, Mrs. S. Shyamal Gowri, Mr. R. Prakash and Mrs. A. Fathima Darras Gracy- studied the possibility of using coconut coir fiber waste as a sustainable construction material in the production of concrete paver blocks. The study highlights that paver blocks play a major role in the construction sector and the incorporation of natural waste materials such as coconut fiber can enhance sustainability and reduce environmental pollution. The authors emphasized that coconut coir waste is generated in large quantities from coconut husk industries, and the selected case study was based on a real local issue where nearly 50 kg of coconut coir waste is produced daily, creating disposal problems. In their experimental investigation, the authors prepared concrete paver blocks by partially replacing fine aggregate with coconut fiber waste in varying proportions of 0.5%, 0.6% and 0.7% by weight. The study mainly focused on determining the optimal mix proportion of coir fiber waste in concrete, evaluating the strength behavior of paver blocks, and analyzing the environmental impact compared to conventional paver block manufacturing methods. The research findings indicated that the inclusion of coir fiber waste improves the eco-friendly nature of paver blocks and also contributes to better performance by providing improved toughness and crack resistance due to fiber reinforcement action.

[3] An Experimental Investigation on Concrete Pavers Block by Replacement of Fine Aggregate with Plastic Waste" (2024), the authors **Mr. Basavalingappa, Rudagi Diggaja, Shashank R., Chaitanya Kumar M., and Gorakh Bahadur Chand (2024)** conducted an experimental study to examine the feasibility of utilizing plastic waste as a partial replacement of fine aggregate in the manufacturing of concrete paver blocks. The study highlighted that plastic waste has become a serious global environmental problem due to its increasing accumulation in landfills and its slow decomposition nature. To address this challenge, the authors proposed an innovative method of recycling polypropylene (PP) plastic waste for construction applications. In their experimental procedure, the collected plastic waste was melted and converted into 4 mm granules, which were then incorporated into concrete mixtures. The study specifically replaced a portion of fine aggregate particles ranging between 4.75 mm to 2.36 mm with the prepared 4 mm plastic granules in the concrete mix designed for paver block production. After casting, the paver blocks were cured for a standard curing period of 28 days, and compressive strength tests were conducted to evaluate the performance of the modified pavers.

[4] Review Paper on Design of Permeable Paver Block" (2024), the authors **Mansi Achle, Neha, Tripti Dhruw, Vandana Gawde, Ajay Kumar Garg, and Bhumika Chandrakar (2024)** presented a review-based experimental analysis on the design and performance of permeable paver blocks aimed at improving stormwater management and reducing surface runoff. The authors highlighted that permeable paver blocks are specially designed pavement units containing gaps and openings that allow rainwater to infiltrate into the ground rather than flowing as surface runoff, thereby supporting groundwater recharge and improving environmental sustainability. The study emphasized that permeable pavers play an important role in reducing flooding risk and improving water infiltration in urban areas. In this work, three different sample paver blocks were prepared using a tri-hexa mould of 60 mm thickness, where the first sample was manufactured using a nominal mix design of M10 grade concrete consisting of cement, sand and coarse aggregate, the second sample was prepared with the addition of admixture, and the third sample was prepared without using fine aggregate to enhance permeability. The performance evaluation was conducted through various laboratory tests such as compressive strength test, flexural strength test, infiltration rate measurement, and permeability test to determine the suitability of each mix proportion.

[5] Enhancing the Mechanical Properties' Performances Coconut Fiber and CDW Composite in Paver Block: Multiple AI Techniques with a Performance Analysis" (2024), the authors **G. Uday Kiran, G. Nakkeeran, Dipankar Roy, Sumant Nivarutti Shinde and George Uwadiegwu Alaneme (2024)** investigated the improvement of mechanical properties of paver blocks by incorporating coconut fibre and construction and demolition waste (CDW) as a partial replacement of fine aggregate along with the use of advanced artificial intelligence (AI) and machine learning techniques for prediction and optimization. The study highlighted that rapid construction activities in developing countries like India have significantly increased the generation of construction and demolition waste, estimated to be nearly 3 billion metric tons annually, which creates serious environmental problems such as depletion of natural resources, dust and carbon emissions, land damage and excessive energy consumption. The authors emphasized that paver block manufacturing requires a large quantity of natural aggregates, contributing to resource depletion, and hence utilization of waste materials like CDW is a sustainable solution. In this experimental program, CDW was used as a replacement of fine aggregate in different proportions such as 0%, 20%, 40% and 60%, while coconut fibre was incorporated in proportions of 0.2%, 0.4%, 0.6%, 0.8% and 1% to evaluate mechanical performance.

The study reported that CDW replacement significantly enhanced compressive strength up to an optimum level, where strength improvement was observed up to around 40% CDW replacement, while beyond this level the strength reduced. The coconut fibre addition improved ductility, crack resistance and reduced brittleness, thereby improving the overall toughness of paver blocks. A major contribution of this study is the integration of multiple AI and machine learning models such as Response Surface Methodology (RSM), Support Vector Machine (SVM), Gradient Boosting (GB), Artificial Neural Networks (ANN), and Random Forest (RF) for predicting and optimizing compressive strength and performance parameters.

[6] Eco-Friendly Paver Block Using Waste Plastic Bottles" (2024), the authors Dr. O. R. Kavitha, Jaishwin S. R., Desingraja S., Dibish J., and Jagadeesan K. (2024) investigated the development of eco-friendly paver blocks by utilizing waste plastic bottles (LDPE waste) along with processed coconut fiber as an alternative sustainable construction material. The study was carried out with the main intention of reducing environmental degradation caused by plastic waste accumulation and to promote the use of renewable natural resources in construction applications. The authors highlighted that plastic composites degrade very slowly due to their chemical bonding and durability, leading to serious environmental problems, especially in landfills and marine ecosystems. The paper emphasized that the rapid growth of construction activity and infrastructure development has increased the demand for low-cost building materials, particularly in developing countries like India where the high cost of construction materials makes housing unaffordable for many people. The authors stated that India consumes around 40 million metric tons of plastics annually, and most of it eventually becomes waste, creating severe environmental pollution, with an increasing growth rate of about 1.5% to 2% per year. In this experimental investigation, the authors used waste LDPE plastic along with coconut fiber to manufacture paver blocks and conducted tests such as compressive strength test, water absorption test, and melting point test to evaluate the performance of the developed paver blocks. The key findings of the study revealed that the addition of coconut fiber resulted in a reduction of compressive strength of the paver blocks; however, the study concluded that the developed eco-friendly paver blocks still provide a sustainable alternative for construction purposes by effectively utilizing waste plastic materials and supporting waste management practices.

[7] Investigation of Concrete Paving Block Characteristics and Performance across Different Shapes and Thicknesses" (2024), the authors **Tommy Iduwin, Sigit Pranowo Hadiwardoyo, R. Jachrizal Sumabrata, Riana Herlina Lumingkewas, and Andri Irfan Rivai (2024)** conducted a detailed experimental investigation to evaluate the characteristics and performance of concrete paving blocks produced in different shapes and thicknesses. The study highlighted that concrete paving blocks (CPBs) are widely used in pavement structures, but variations in block geometry and thickness significantly influence the test results and mechanical behavior. The authors selected a total of 60 paving block samples collected from five different factories, with standard dimensions of 200 mm length and 100 mm width, while the thickness was varied as 60 mm, 80 mm, and 100 mm to study the effect of block height on strength and durability parameters. The experimental testing program included water absorption, compressive strength, flexural strength, tensile splitting strength, skid resistance, and abrasion resistance, which are essential parameters for evaluating pavement block performance under traffic and environmental exposure. The study findings indicated that the mortar content among samples from different factories showed no major difference, suggesting uniformity in material composition across sources. The results further revealed that weight loss values were strongly dependent on strength, meaning higher strength paving blocks exhibited lower abrasion loss and improved durability.

[8] Characterisation of Pervious Interlocking Pavers for Durable Pavements: A Laboratory Study" (2023), the authors **Mudasir Nazeer, Kanish Kapoor and S. P. Singh (2023**) conducted a detailed laboratory investigation to evaluate the strength and durability characteristics of Pervious Interlocking Pavers (PIP) for sustainable pavement applications. The authors explained that pervious concrete is a special type of concrete produced by minimizing or completely excluding fine aggregates from the mix, which allows water infiltration through pavement surfaces and helps in reducing local flooding problems in municipal areas, thereby decreasing the burden on urban drainage systems. In this study, the authors developed pervious interlocking pavers using three different aggregate grades with varying fine aggregate proportions of 0%, 10% and 20%, and additionally studied the effect of partially replacing ordinary Portland cement with 10% silica fume. During the experimentation, the powder-to-aggregate ratio and water-cement ratio were maintained constant at 0.2 and 0.35, respectively, in order to maintain consistency in results. The study primarily focused on evaluating key pavement performance parameters such as compressive strength, flexural strength, abrasion resistance, freeze-thaw resistance, permeability and microstructural characteristics. The findings revealed that the inclusion of 20% fine aggregates significantly improved the strength and durability of pervious interlocking pavers without reducing permeability beyond acceptable limits at 28 days curing period.

The results indicated a notable increase in compressive strength of about 15.7% for 10% fine aggregate substitution (PC10) and 35.7% for 20% fine aggregate substitution (PC20) compared to the control mix.

[9] Assessment of Interlocking Concrete Block Pavement with By-Products and Comparison with an Asphalt Pavement: A Review" (2023), the authors **Webert Silva, Luís Picado-Santos, Suelly Barroso, Antônio Eduardo Cabral, and Ronaldo Stefanutti (2023)** presented a comprehensive review on the performance of Interlocking Concrete Block Pavement (ICBP) incorporating different by-products such as coconut fibers and construction and demolition recycled materials, and compared its performance with conventional asphalt pavement for light-traffic urban road applications. The study mainly focused on reviewing the mechanical behavior of ICBP, influence of mix parameters and by-products on strength, pavement structural design aspects, sustainability performance, permeability and stormwater management characteristics, contaminant concentration behavior during infiltration, and Life Cycle Assessment (LCA) based evaluation. The authors discussed that ICBP consists of concrete paving blocks arranged with jointing materials and bedding layers, which makes its behavior different from asphalt pavements where the surface layer is more homogeneous and stiff. The review highlighted that ICBP offers significant sustainability advantages such as lower heat island effect and improved thermal comfort due to lower surface temperature compared to asphalt pavements. Based on the overall analysis, the authors concluded that interlocking concrete block pavement is a highly attractive alternative because it was found to be approximately 33–44% cheaper in maintenance costs, cooler by about 2.2°C to 15°C, and more permeable with permeability values in the range of 0.4 cm/s to 0.6 cm/s, thus supporting better drainage and stormwater management compared to asphalt pavements.

[10] Construction of Cement Concrete Pavement Using Paver Blocks (2023) By Roshan Kumar Nayak, Uttam Mandal, Biraja Sankar Pradhan, and Prof. Abhijit Mangaraj (Guide)- studied the feasibility and practical importance of using **cement concrete paver blocks** as an alternative pavement system for different traffic categories. The authors described that solid unreinforced precast cement concrete paver blocks are versatile pavement units which are aesthetically attractive, cost effective, functional, and require low maintenance if manufactured and laid properly. The study highlighted that paver blocks can be adopted for multiple traffic conditions such as non-traffic, light traffic, medium traffic, heavy traffic and very heavy traffic areas. The authors discussed that although concrete block pavements have performed satisfactorily in many regions, there are some key concerns such as occasional failure due to excessive surface wear and variability in block strength depending upon material quality and manufacturing process. The study emphasized that paver blocks are widely used in applications such as driveways, footpaths, utility areas, garages, forecourts and roads due to their strong interlocking mechanism and ease of repair. The research also explained that after the service life of paver blocks, demolished blocks can be reused conveniently as recycled aggregate, promoting sustainability in construction. The study strictly followed codal guidelines of IS 15658:2006 for paver block construction, and aggregates passing through 20 mm sieve and retained on 4.75 mm sieve were selected for mix preparation. The authors further mentioned the importance of removing contaminants such as reinforcement steel, paper, wood, plastics, gypsum and other impurities while preparing recycled aggregates, and concrete prepared using recycled concrete aggregates was referred to as Recycled Aggregate Concrete (RAC).

[11] Experimental Study on Properties of Paver Block using Coconut Fibre & Nylon Fibre (2023), the authors Dr. M. Harikaran, R. Vijayan, P. Senthil Kumar, R. S. Suganth, R. Nithishkumar and V. Vijay (2023) conducted an experimental investigation to study the influence of coconut fibre (natural fibre) and nylon fibre (synthetic polymer fibre) on the mechanical and durability properties of concrete paver blocks. The study highlighted that paver blocks are widely used in pavement and pathway construction due to their toughness, strength, durability, and ease of maintenance. The authors emphasized that fibre reinforcement in concrete is an effective method to improve performance by enhancing tensile strength, toughness, and crack resistance. Coconut fibre, extracted from coconut husk, is recognized as an eco-friendly natural reinforcement material, while nylon fibre is a synthetic polymer fibre commonly used to improve concrete characteristics. In this study, M40 grade concrete paver blocks were designed and prepared by adding coconut fibre and nylon fibre in different proportions of 0.2%, 0.4%, 0.6% and 0.8% by volume of concrete, and the results were compared to evaluate the best fibre type and optimum dosage. The experimental program included tests such as compressive strength test, water absorption test, and abrasion resistance test, which are important for evaluating the structural performance and durability of paver blocks under pavement conditions. The specimens were tested after 14 days and 28 days of curing to assess strength development and long-term performance. The major findings of the study indicated that the inclusion of fibres improved the overall mechanical behavior of the paver blocks by increasing toughness and resistance to cracking, while also influencing durability parameters such as water absorption and abrasion resistance.

[12] Utilization of Industrial Waste Materials in the Construction of Interlocking Paver Blocks for Medium Traffic Areas (2022) By Mr. Manoj S. Nayak, Mr. Karthik M., and Mr. Pramod B. V.- investigated the feasibility of using recycled aggregate as a partial replacement of fine aggregate in the manufacturing of interlocking concrete paver blocks suitable for medium traffic conditions. The study highlighted that the utilization of industrial waste materials and recycled aggregates in paver blocks can contribute to sustainable construction by reducing the consumption of natural resources and lowering the cost of production. In this experimental investigation, the authors designed interlocking paver blocks of 80 mm thickness using M40 grade concrete, with a targeted strength of 48 MPa, and replaced fine aggregate with recycled aggregate in varying proportions of 10%, 20%, and 30%. The concrete mix was prepared for each replacement ratio, and workability was evaluated using the slump cone test to ensure proper consistency for casting. After casting, the paver blocks were cured for 7 days and 28 days, and mechanical performance was assessed through hardened concrete tests, mainly the compressive strength test. The study also included a cost analysis to determine the economic feasibility of using recycled aggregates in interlocking paver blocks.

[13] A Study of Interlocking Behaviour of Concrete Block Used in Pavements (2022) By Viveka Nand and Deepak Kumar- studied the interlocking behaviour and structural performance of Concrete Block Pavement (CBP) systems used in pavement construction. The authors explained that in interlocking concrete block pavements, the blocks form the wearing surface and act as a major load-spreading component of the pavement structure. Unlike conventional rigid or flexible pavements, CBP consists of small concrete paving units embedded and joined using sand rather than a continuous pavement layer. The study also mentioned that the pavement substructure below the bedding sand remains similar to flexible pavements, making it structurally comparable. The authors highlighted that concrete block pavements are gaining popularity in areas where conventional flexible pavements fail due to poor durability and deformation issues. The paper discussed that CBP is widely adopted because of its advantages such as high resistance to deformation, long durability, easy and rapid construction, immediate opening to traffic after laying, environmental compatibility and improved aesthetic appearance. The authors emphasized that although CBP behaves structurally similar to flexible pavements, its performance is highly dependent on construction and design factors such as block shape, block size, block thickness, bedding sand type, jointing sand type, joint width, and laying pattern of blocks.

[14] An Experimental Investigation on Strength of Paver Block Using Dolomite as Partial Replacement of Cement and Addition of Polyester Fiber in Different Proportions (2021) By Shilpa Agrawal and Prof. Anil Kumar Suman- carried out an experimental study on improving the mechanical performance of concrete paver blocks by partially replacing cement with dolomite powder and incorporating polyester fiber in different proportions. The authors highlighted that cement is a binding material having adhesive and cohesive properties, but its high cost and environmental impact encourage the use of alternative materials. Dolomite powder, obtained from sedimentary rock minerals such as dolostone, possesses similar properties to cement and can be used as a partial replacement to reduce cost while maintaining strength. The study also emphasized that polyester fiber is a synthetic man-made fiber produced from long-chain polymer materials and its addition in concrete helps to improve tensile strength, crack resistance and overall durability of paver blocks. In this research, the authors adopted M30 grade concrete mix design with a constant water-cement ratio of 0.36, and cement was replaced with dolomite powder in proportions of 0%, 10%, 20% and 30%, while polyester fiber was added in proportions of 0%, 0.1%, 0.2% and 0.3%. The mix design was carried out as per IS 15658:2006 and IRC SP:63-2004 guidelines for concrete paver blocks, and 10 mm size coarse aggregate was used in casting. The experimental evaluation included compressive strength testing at 7, 14 and 28 days, and durability-related strength parameters such as split tensile strength and flexural strength tests were conducted at 28 days.

[15] New High Strength Water Retaining Interlocking Pavers Block for High Mechanical Performing Pavement and Reducing Runoff (2020) By M. A. H. Abdullah, N. A. Rashid, A. L. Abdul Rani, and M. F. Omar- investigated the development of a new type of interlocking paver block aimed at improving both mechanical strength and water retaining performance to reduce surface runoff. The authors explained that interlocking paver blocks are widely used in low-speed traffic roads, especially around building complexes, because they are easy to install, require less construction equipment, and provide an aesthetically attractive pavement surface. However, the study highlighted a major drawback that the large-scale usage of conventional interlocking blocks reduces ground permeability, which results in increased runoff and poor stormwater infiltration. To overcome this issue, the researchers developed and evaluated two innovative types of interlocking paver blocks: one using permeable concrete and another having a central void to enhance infiltration capacity.

The experimental investigation focused on analyzing compressive strength, flexural strength, runoff reduction, and infiltration performance. The results indicated that the paver blocks made with permeable concrete exhibited significantly higher compressive strength compared to the blocks with central void, with an average improvement of about 31.5%. The flexural strength of all tested samples was reported within the range of 1.0 to 1.7 MPa, indicating acceptable bending resistance. In terms of runoff reduction, the paver blocks with central void showed the best performance, achieving a runoff reduction of about 25.5%, which was supported by water infiltration test results.

[16] Analysis of Porous Interlocking Concrete Paver Block with Fly Ash & Coconut Fiber (2020) By Yash Chaurasiya and Dr. S. S. Goliya- presented an experimental study on the development and performance evaluation of porous interlocking concrete paver blocks incorporating fly ash and coconut fiber. The study highlighted that in developing countries like India, the rapid population growth increases the demand for economical and durable pavement solutions, and paver blocks are considered a better alternative to conventional concrete and bitumen pavements due to their easy installation, better finishing, improved aesthetics, and low maintenance cost. However, the authors identified a major limitation of conventional concrete paver blocks, which is the issue of water logging during rainy seasons, as traditional paver blocks are non-porous and do not allow water infiltration, leading to surface accumulation of water unless slopes are provided. To overcome this problem, the authors proposed the production of porous concrete paver blocks using locally available materials and fly ash to improve sustainability and reduce cost. The study emphasized that porous paver blocks not only reduce water logging but also help in minimizing surface runoff pollution and prevent mixing of surface waste into surface water. In their experimental investigation, fly ash was used as a partial replacement of cement in proportions of 10%, 15%, 20% and 25% by weight of cement, while coconut fiber was incorporated in different dosages of 0.2%, 0.5%, 0.8% and 1% by volume of concrete, and gypsum was added in 1–2% by weight of cement. The authors performed various tests including compressive strength test, split tensile strength test, and water absorption test on both porous and conventional paver blocks at curing ages of 7, 14 and 28 days. The findings revealed that coconut fiber significantly contributed to reducing cracks and improving flexural behavior, while fly ash replacement enhanced strength and sustainability.

[17] Strength Evaluation of Pre-Cast Concrete Paver Block, Using Steel Slag & PET Fibres (2017) By Rajbir Singh and Dr. Sanjay Goel- investigated the strength performance of precast concrete paver blocks by incorporating steel slag as partial replacement of fine aggregate along with the addition of waste PET fibres in different proportions. The main objective of the study was to evaluate how industrial waste materials such as steel slag and plastic waste PET fibres can be effectively utilized in the manufacturing of concrete paving blocks to enhance mechanical properties and promote sustainable construction practices. In this experimental study, the authors cast standard zigzag type paver blocks of 60 mm thickness using M35 grade concrete and conducted laboratory testing to assess the strength improvement. The performance of the paver blocks was mainly evaluated based on key mechanical parameters such as compressive strength and flexural strength, which are important for pavement applications subjected to traffic loading.

[18] A Review on Precast Cement Concrete Paver Blocks Using Fly Ash (2017) By Vikas Kumar Patel and V. V. Singh- presented a detailed review on the application of fly ash and other industrial waste materials in the production of precast cement concrete paver blocks. The authors explained that paver blocks are widely used in street roads and various construction applications due to their aesthetic appearance, durability, cost-effectiveness, and low maintenance requirements when properly manufactured and laid. The study highlighted a major environmental issue associated with the construction industry, where the manufacturing of Portland cement produces a large amount of carbon dioxide (CO_2), which contributes significantly to global warming as a greenhouse gas. Therefore, the authors emphasized the importance of using supplementary cementitious materials like fly ash to reduce cement consumption and environmental impact. The review discussed that solid unreinforced precast cement concrete paver blocks can be used for different traffic categories and provide an effective pavement solution.

[19] Structural Design of Interlocking Concrete Paving Block (2016) By E. Palanikumar and Pothuganti Uday Kumar- studied the structural design aspects and performance parameters of segmented interlocking concrete paving blocks used for pavement construction. The authors described interlocking concrete pavement as a system of individual shaped blocks arranged to form a continuous and hard-wearing surface overlay, which acts as an important load-spreading component of pavement systems. The study emphasized that despite several advantages, the application of interlocking concrete pavements has not been fully utilized in India. The research focused on evaluating various important factors such as interlocking mechanism, block shape, thickness, compressive strength, size, laying pattern and cost analysis to achieve maximum load transfer and pavement stability.

The authors compared the interlocking properties of shaped pavers with normal rectangular pavers through compression testing to assess load transfer capacity. The study highlighted that a superior interlocking system improves surface stability and enhances pavement performance under heavy traffic loads. Additionally, the authors discussed key advantages of interlocking pavements such as freeze-thaw resistance, skid resistance, easy maintenance, no requirement of heavy construction equipment and immediate opening to traffic, making it an efficient alternative pavement system. The paper also discussed design considerations including deformation behavior, load transfer mechanisms, and the influence of environmental factors such as moisture on pavement stability. The authors noted that soil subgrade conditions significantly affect the total pavement thickness and recommended the use of California Bearing Ratio (CBR) testing for evaluating subgrade support, while resilient modulus values can be adopted in absence of laboratory testing.

[20] Effect of Polypropylene Fibers on Abrasion Resistance and Flexural Strength for Interlocking Paver Block (2013) By Bhavin K. Kashiyani, Prof. Jayeshkumar Pitroda, and Dr. Bhavnaben K. Shah- studied the influence of polypropylene fibers (PPF) on improving the abrasion resistance and flexural strength of interlocking concrete paver blocks. The authors highlighted that paver blocks are widely used in street roads and construction applications because of their ease of replacement, low maintenance cost, and suitability as an alternative pavement surface system. However, abrasion wear and flexural cracking are common issues in paver blocks, particularly under traffic loading and repeated surface friction. Therefore, the study aimed to enhance the durability and service life of paver blocks by incorporating polypropylene fibers into the concrete mix. In this experimental investigation, the authors adopted a two-layer paver block casting method, where the top layer mix proportion was 1:3 (Cement: Dolomite Powder) and the bottom layer mix proportion was 1:1:2:3.75 (Cement: Fine Aggregate: Semi Grit: Quarry Dust). Polypropylene fibers were added in both layers at different dosages of 0.1%, 0.2%, 0.3%, 0.4% and 0.5% by weight of the mix. The paver blocks were cured and tested at 28 days, and the primary tests conducted were abrasion resistance test and flexural strength test, which are important parameters for evaluating pavement block performance. The experimental results revealed that the addition of polypropylene fibers significantly improved both abrasion resistance and flexural strength compared to conventional paver blocks. The findings indicated that 0.3% polypropylene fiber content produced the best improvement in abrasion resistance, while 0.4% polypropylene fiber content resulted in maximum flexural strength enhancement at 28 days.

III. RESEARCH GAP

From the detailed review of previous research studies on paver blocks, reinforcement techniques, and sustainable construction materials, several important research gaps have been identified. Although many researchers have focused on improving the strength and durability of paver blocks using different materials and methods, there are still limitations and unexplored areas that require further investigation. Most of the previous studies have concentrated on the use of waste materials and fibers such as coconut fiber, plastic waste, fly ash, construction and demolition waste, polyester fiber, and polypropylene fiber to improve the mechanical properties and sustainability of paver blocks. These studies have shown that fiber reinforcement enhances crack resistance, toughness, and durability. However, the use of such materials often involves additional processing, cost, and technical complexity, which may not be feasible for all construction practices. A significant number of studies have also focused on material replacement techniques, where cement or fine aggregate is partially replaced with industrial or agricultural waste materials. While these methods improve sustainability and reduce environmental impact, they mainly influence compressive strength and durability, but do not directly address the issue of tensile weakness and crack propagation in concrete. Some researchers have investigated interlocking behavior, block shape, thickness, and bedding conditions affecting pavement performance. These studies highlight the importance of structural arrangement and design parameters in improving load distribution and pavement behavior. However, they do not focus on enhancing the internal strength of individual paver blocks through reinforcement techniques. Although fiber reinforcement has been widely studied, limited research has been carried out on the use of mesh-type reinforcement, especially chicken mesh, in paver blocks. Wire mesh reinforcement has been successfully used in ferrocement and slab applications, where it significantly improves tensile strength, ductility, and crack resistance. However, its application in paver blocks remains largely unexplored. Another important gap identified is that very few studies have focused on low-cost and easily available reinforcement materials. Most of the existing reinforcement techniques involve either costly fibers or processed materials, which may not be suitable for large-scale or rural construction projects. There is a need for an economical reinforcement method that can be easily implemented without requiring advanced technology or high investment.

Furthermore, existing studies have primarily focused on compressive strength and water absorption tests, while limited attention has been given to other important parameters such as flexural strength, impact resistance, and crack behavior, which are critical for paver block performance under real loading conditions. In addition, there is a lack of experimental studies comparing conventional paver blocks with reinforced paver blocks using simple reinforcement techniques under identical conditions. Such comparative analysis is necessary to clearly understand the effectiveness of reinforcement in improving structural performance.

Therefore, the major research gaps identified are:

- Limited studies on the use of chicken mesh reinforcement in paver blocks
- Lack of research on mesh-based reinforcement techniques in pavement blocks
- Absence of low-cost reinforcement solutions suitable for practical applications
- Insufficient focus on tensile strength and crack control mechanisms
- Limited evaluation of flexural strength and impact resistance
- Lack of comparative experimental analysis between conventional and reinforced paver blocks

To address these gaps, the present study focuses on the experimental investigation of chicken mesh reinforced paver blocks. This research aims to evaluate the strength characteristics, crack resistance, and overall performance of paver blocks using a simple, economical, and effective reinforcement method. The findings of this study will contribute to the development of stronger, more durable, and cost-effective paver blocks for practical construction applications.

CONCLUSION

From the comprehensive and detailed review of previously published research studies on concrete paver blocks, it can be clearly concluded that significant progress has been made in improving their performance through various material innovations, reinforcement techniques, and design modifications. The incorporation of natural fibers such as coconut fiber and synthetic fibers such as nylon and polypropylene has been found to enhance tensile strength, toughness, and crack resistance, while the use of industrial and agricultural waste materials such as fly ash, plastic waste, construction and demolition waste, recycled aggregates, and steel slag has contributed to sustainable construction practices by reducing environmental impact and conserving natural resources. Additionally, advancements in permeable and porous paver blocks have addressed critical issues related to stormwater management, groundwater recharge, and urban flooding, thereby improving the overall environmental performance of pavement systems. Studies focusing on block geometry, thickness, interlocking mechanisms, and bedding conditions have also demonstrated that structural design parameters play a crucial role in load distribution, deformation control, and durability of paver block pavements. However, despite these advancements, the review reveals that conventional concrete paver blocks still suffer from inherent limitations such as low tensile strength, brittle behavior, and susceptibility to crack formation under repeated loading and environmental variations. Most of the existing research has primarily focused on enhancing compressive strength and sustainability aspects, while comparatively less attention has been given to improving tensile behavior, flexural strength, impact resistance, and crack control mechanisms, which are equally important for long-term performance. Furthermore, although fiber reinforcement has shown promising results, it often involves higher cost, processing complexity, and limited feasibility for large-scale or rural applications. Similarly, the use of waste materials, while beneficial for sustainability, does not directly address the fundamental issue of tensile weakness in concrete. A critical observation from this review is the lack of research on mesh-based reinforcement techniques, particularly the use of chicken mesh in concrete paver blocks. While mesh reinforcement has been successfully applied in ferrocement structures to improve ductility, load-carrying capacity, and crack resistance, its application in paver blocks remains largely unexplored. This highlights a significant research gap and an opportunity for further investigation. Chicken mesh, being economical, easily available, and simple to use, has the potential to provide an effective and practical solution for enhancing the mechanical performance of paver blocks without significantly increasing cost or complexity.

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