Journal of Science, Computing and Engineering Research (JSCER)
Volume-7, Issue-7, July 2024.
DOI: *https://doi.org/10.46379/jscer.2023.070701*
ISSN: 2708-1079

Study Analysis of Pavement Block Factor Types in Pavement Construction

Raju Patel, Rishil Mayank

Assistant Professor,Department of Civil Engineering, Mahatma Gandhi Mission college of Engineering & Technology Kamothe Navi Mumbai

Article Information

Received : 02 July 2024
Revised : 06 July 2024
Accepted : 18 July 2024
Published : 22 July 2024

Corresponding Author:
Raju Patel

Abstract— The use of different types of pavement block has been increased in India a decade ago. The specific requirements of paver block has been increased in the areas of footpaths and parking areas. Port land Cement Concrete and Asphalt Concrete are the most common roadway and highway construction material used. It is very necessary to use the materials which is durable and have the high compressive strength and can absorb the water to greater extent to have the greater water absorption value. In this project we have given greater stress on about the use of materials and machinery involved for the manufacture of different types of paver block in construction Purposes. For design of paver block the tests is to be performed is used to find the compressive strength and water absorption. The blocks having greater compressive strength and of less cost and can be used for much more time have been studied out in this project.

Keywords: ***Compressive Strength Test, Water Absorption Test, Port Land Cement, Asphalt Concrete***

Citation: Raju Patel, Rishil Mayank, "Study Analysis of Pavement Block Factor Types in Pavement Construction", Journal of Science, Computing and Engineering Research, 7(7), July 2024.

I. INTRODUCTION

Concrete paving is a system of individual shaped blocks arranged to form a continuous hardwearing surface overlay. Over the past two decades, paving composed Segmental block shall become a feature of our towns and cities. It is to be found in commercial industrial and residential areas, in the paving malls, plazas, parking areas and bus stops. It has been successfully used for embankment walls, slope protection and erosion control. During this period, extensive research has been carried out on the engineering characteristics and structural performance of segmental block paving. Existing pavements subjected to heavy bus traffic and industrial loads have been monitored and their service life shown to be satisfactory. The South African Bureau of Standards has published specifications relating to the quality of concrete paving blocks and required standards of construction. The Committee of Urban Transport Authorities has published a catalogue of designs for segmental block pavements. The engineering and specification aspects have been satisfactorily solved, and this type of paving has a proven performance and service record. Concrete paver blocks are first introduced in Holland in the fifties as replacement of paver brick which has become scarce due to post war building construction boom. These blocks were rectangular in shape and had more or less same size as bricks. During the past five decades, the block shapes has steadily evolved from non-interlocking to partially interlocking to fully interlocking to multiply interlocking shapes. Consequently, the pavements in which non interlocking blocks are used are designated as concrete block pavement (CBP) or non-interlocking CBP, and those in which partially, fully or multiply interlocking blocks are used are designated as interlocking concrete block pavement (ICBP). The first record of stone paving dates back to 4000 BC in Assyria and by 2000BC, flagstones were being used to pave village streets. Cobble stones were the traditional method of stone paving, being uncut and often water-worn stones or large pebbles about 150mm in size. Later hand-cut stone blocks were introduced. Road-making using brick was common in Mesopotamian 2000 BC and clay brick paving was in use in India in 300 BC. It was the Romans who introduced hexagonal-shaped flagstones as a surface course, so the concept of shaped, rather than rectangular blocks is certainly not new. Perhaps the most famous of all Roman roads is the Appian Way, built by Roman engineers in 312 BC. The 377 kilometer road was surfaced with tight-fitting paving stones that still carries traffic between Rome and Italy's south-eastern port of Brandis

II. RELATED WORKS

The study of Literature includes deep investigation of the research done in past decades aiming to provide paver blocks of different grades and of high compressive strength. In this review the world wide work was carried by some of the researches is studied thoroughly and their observations are enumerated in subsequent paragraph. M.C.Natraja & Lelin Das (2013) intends to investigate the various strength parameter by mixing certain percentage of conventional materials such as Kadapa and broken pavers are replacement of coarse aggregates. Their study mentions the use of unconventional material is must suitable only for water absorption and compressive strength. However the percentage of variations can be varied for gaining strength. Francis Dutruel & Jacques Dardare (2010) examined the

hypothesis design of road pavement which was considered for pavement cohesion and their work was done on block pavement which distributesthe surface pressure and bring sub base especially when sub base is flexible and contribute overall length of road surface. Their conclusion was based on the block thickness which was the major factor as for its structural effect when the block shape laying pattern is done. Prahallada M.C & Prakash K.B (2010) studied the impact on strength properties of concrete in replacing some portion of concrete by quarry sludge got from a nearby crusher unit. The research work did incorporated a test examination on strength properties of cement made with 2.5% to 20% substitution of cement by quarry dust of under 75 micron particle size. The tests were completed to find the compressive strength, splitting tensile strength and flexural strength on samples. Results demonstrated that up to 7.5 % substitution of cement by quarry dust there was no reduction in compressive strength, splitting tensile strength and flexural strength. Vishal Panchal (2012) made the comparative study of interlocking of paver block in their research they studied about compression strength, abrasion resistant strength, and also reduction in curing time of paver block .They have established relation between quantity of polypropylene fiber used and its Impact on the respective strength of concrete paver block. Finally their conclusion was successfully studied about effect of polypropylene fiber on the interlock paver block and its complete study has been done between convention block and polypropylene reinforced pavement block. M.S Parthini (2014) conducted study on cost effective paver block. Their intention was to produce interlocking concrete paver block by using manufacturing sand without curing. The main reason for using manufacturing sand is to reduce the land fill problem and also to control the depletion on natural resources. The analysis was about, by the use of manufacturing sand and aggregate for the manufacture of paver block with of less cost. They conducted various test such as compressive water absorption, flexural, tensile strength. They suggested the use of conventional paver block is economical. MD.Abdul Alam & Shagufta Naaz (2015) analysis was about different size of aggregate which was prepared to find the compressive strength and the effect of percentage of fine aggregate. The purpose of their work was to analyze the feasibility of highly sustainable concrete mixture and evaluating the effect of fine aggregate on their properties. They mentioned that porosity has significant effect on compressive strength and course aggregate with aggregate up to 20% of significant effect on the porosity

III. BACKGROUND OF STUDY

The circuit diagram of the single tail comparator shown in Fig 3. The single tail are in on position now the output at OUTN and OUTP will be VDD. When CLK= VDD , Mtail NMOS transistor is in ON position and M7 and M8 PMOS transistors are in OFF position now the OUTN and OUTP urrent to keep the differential amplifiers in weak condition so a large current required enabling fast regeneration in the circuit.

IV. METHODOLOGY

This structure has the power consumption 20.49 nW and circuit delay is 38.83 ps. Circuit diagram of the conventional double tail comparator shown in Fig 4. This structure has low static power consumption and operates at lower supply voltages compare to the single tail comparator. The working of this comparator input and Mtail1 transistor. To overcome static power consumption in proposed double tail comparator two NMOS transistors MSW1 and MSW2 used below the input transistor

V. CONCLUSION

Many researches has been studied to find the proportion of paver block and they have also compared the cost of conventional and unconventional methods of manufacturing paver block. Their study mentions use of conventional paver block is more economical and by varying the percentage of materials and the strength of paver block can be enhanced.

REFERENCES

[1]. P. Nirmala, T. Manimegalai, J. R. Arunkumar, S. Vimala, G. Vinoth Rajkumar, Raja Raju, "A Mechanism for Detecting the Intruder in the Network through a Stacking Dilated CNN Model", Wireless Communications and Mobile Computing, vol. 2022, Article ID 1955009, 13 pages, 2022. https://doi.org/10.1155/2022/1955009.

[2]. D. Sathyanarayanan, T. S. Reddy, A. Sathish, P. Geetha, J. R. Arunkumar and S. P. K. Deepak, "American Sign Language Recognition System for Numerical and Alphabets," 2023 International Conference on Research Methodologies in Knowledge Management, Artificial Intelligence and Telecommunication Engineering (RMKMATE), Chennai, India, 2023, pp. 1-6, doi: 10.1109/RMKMATE59243.2023.10369455.

[3]. J. R. Arunkumar, Tagele berihun Mengist, 2020" Developing Ethiopian Yirgacheffe Coffee Grading Model using a Deep Learning Classifier" International Journal of Innovative Technology and Exploring Engineering (IJITEE) ISSN: 2278-3075, Volume-9 Issue-4, February 2020. DOI: 10.35940/ijitee.D1823.029420.

[4]. Ashwini, S., Arunkumar, J.R., Prabu, R.T. et al. Diagnosis and multi-classification of lung diseases in CXR images using optimized deep convolutional neural network. Soft Comput (2023). https://doi.org/10.1007/s00500-023-09480-3

[5]. J.R.Arunkumar, Dr.E.Muthukumar," A Novel Method to Improve AODV Protocol for WSN" in Journal of Engineering Sciences" ISSN NO: 0377-9254Volume 3, Issue 1, Jul 2012.

[6]. R. K, A. Shameem, P. Biswas, B. T. Geetha, J. R. Arunkumar and P. K. Lakineni, "Supply Chain Management Using Blockchain: Opportunities, Challenges, and Future Directions," 2023 Second International Conference on

Informatics (ICI), Noida, India, 2023, pp. 1-6, doi: 10.1109/ICI60088.2023.10421633.

[7]. Arunkumar, J. R. "Study Analysis of Cloud Security Chanllenges and Issues in Cloud Computing Technologies." Journal of Science, Computing and Engineering Research 6.8 (2023): 06-10.

[8]. J. R. Arunkumar, R. Raman, S. Sivakumar and R. Pavithra, "Wearable Devices for Patient Monitoring System using IoT," 2023 8th International Conference on Communication and Electronics Systems (ICCES), Coimbatore, India, 2023, pp. 381-385, doi: 10.1109/ICCES57224.2023.10192741.

[9]. S. Sugumaran, C. Geetha, S. S, P. C. Bharath Kumar, T. D. Subha and J. R. Arunkumar, "Energy Efficient Routing Algorithm with Mobile Sink Assistance in Wireless Sensor Networks," 2023 International Conference on Advances in Computing, Communication and Applied Informatics (ACCAI), Chennai, India, 2023, pp. 1-7, doi: 10.1109/ACCAI58221.2023.10201142.

[10]. R. S. Vignesh, V. Chinnammal, Gururaj.D, A. K. Kumar, K. V. Karthikeyan and J. R. Arunkumar, "Secured Data Access and Control Abilities Management over Cloud Environment using Novel Cryptographic Principles," 2023 International Conference on Advances in Computing, Communication and Applied Informatics (ACCAI), Chennai, India, 2023, pp. 1-8, doi: 10.1109/ACCAI58221.2023.10199616.

[11]. Syamala, M., Anusuya, R., Sonkar, S.K. et al. Big data analytics for dynamic network slicing in 5G and beyond with dynamic user preferences. Opt Quant Electron 56, 61 (2024). https://doi.org/10.1007/s11082-023-05663-2

[12]. Krishna Veni, S. R., and R. Anusuya. "Design and Study Analysis Automated Recognition system of Fake Currency Notes." Journal of Science, Computing and Engineering Research 6.6 (2023): 16-20.

[13]. V. RamKumar, S. Shanthi, K. S. Kumar, S. Kanageswari, S. Mahalakshmi and R. Anusuya, "Internet of Things Assisted Remote Health and Safety Monitoring Scheme Using Intelligent Sensors," 2023 International Conference on Advances in Computing, Communication and Applied Informatics (ACCAI), Chennai, India, 2023, pp. 1-8, doi: 10.1109/ACCAI58221.2023.10199766.

[14]. R. S. Vignesh, R. Sankar, A. Balaji, K. S. Kumar, V. Sharmila Bhargavi and R. Anusuya, "IoT Assisted Drunk and Drive People Identification to Avoid Accidents and Ensure Road Safety Measures," 2023 International Conference on Advances in Computing, Communication and Applied Informatics (ACCAI), Chennai, India, 2023, pp. 1-7, doi: 10.1109/ACCAI58221.2023.10200809.

[15]. I. Chandra, G. Sowmiya, G. Charulatha, S. D, S. Gomathi and R. Anusuya, "An efficient Intelligent Systems for Low-Power Consumption Zigbee-Based Wearable Device for Voice Data Transmission," 2023 International Conference on Artificial Intelligence and Knowledge Discovery in Concurrent Engineering (ICECONF), Chennai, India, 2023, pp. 1-7, doi: 10.1109/ICECONF57129.2023.10083856.

[16]. G. Karthikeyan, D. T. G, R. Anusuya, K. K. G, J. T and R. T. Prabu, "Real-Time Sidewalk Crack Identification and Classification based on Convolutional Neural Network using Thermal Images," 2022 International Conference on Automation, Computing and Renewable Systems (ICACRS), Pudukkottai, India, 2022, pp. 1266-1274, doi: 10.1109/ICACRS55517.2022.10029202.

[17]. R. Meena, T. Kavitha, A. K. S, D. M. Mathew, R. Anusuya and G. Karthik, "Extracting Behavioral Characteristics of College Students Using Data Mining on Big Data," 2023 International Conference on Artificial Intelligence and Knowledge Discovery in Concurrent Engineering (ICECONF), Chennai, India, 2023, pp. 1-7, doi: 10.1109/ICECONF57129.2023.10084276.

[18]. S. Bharathi, A. Balaji, D. Irene. J, C. Kalaivanan and R. Anusuya, "An Efficient Liver Disease Prediction based on Deep Convolutional Neural Network using Biopsy Images," 2022 3rd International Conference on Smart Electronics and Communication (ICOSEC), Trichy, India, 2022, pp. 1141-1147, doi: 10.1109/ICOSEC54921.2022.9951870.

[19]. I. Chandra, G. Sowmiya, G. Charulatha, S. D, S. Gomathi and R. Anusuya, "An efficient Intelligent Systems for Low-Power Consumption Zigbee-Based Wearable Device for Voice Data Transmission," 2023 International Conference on Artificial Intelligence and Knowledge Discovery in Concurrent Engineering (ICECONF), Chennai, India, 2023, pp. 1-7, doi: 10.1109/ICECONF57129.2023.10083856.

[20]. Revathi, S., et al. "Developing an Infant Monitoring System using IoT (INMOS)." International Scientific Journal of Contemporary Research in Engineering Science and Management 6.1 (2021): 111-115.