

**A Major Project Report**  
**On**  
**Behaviour of Interlocking Concrete Paver Blocks**  
**by Partial Replacement of**  
**Fine Aggregate with Crumb Rubber**



Submitted to the  
**Department of Civil Engineering**  
**School of Studies of Engineering and Technology**  
in partial fulfilment  
of the requirements for the award of the Degree of  
**BACHELOR OF TECHNOLOGY IN CIVIL ENGINEERING**

Submitted by

**Kshitij Kumar Singh**

(20102026)

**Boyilla Venkata Sai Amith**

(2102050)

**Deepak Pal**

(20102018)

**Raushan Kumar**

(20102040)

Under the guidance of  
**Prof. R. K Choubey**

**DEPARTMENT OF CIVIL ENGINEERING**  
**SCHOOL OF STUDIES IN ENGINEERING AND TECHNOLOGY**  
**GURU GHASIDAS VISHWAVIDHYALAYA**  
(A Central University Established by the Central University Act 2009 No. 25 of 2009)  
**NAAC - A<sup>++</sup> University**

**Session: 2023-24**




**DEPARTMENT OF CIVIL ENGINEERING**  
**SCHOOL OF STUDIES IN ENGINEERING AND TECHNOLOGY**  
**GURU GHASIDAS VISHWAVIDHYALAYA**  
**(A Central university), Bilaspur (C.G.), 495001**

**CERTIFICATE**

This is to Certify that the Major Project Report entitled **“Behaviour of Interlocking Concrete Paver Block by Partial Replacement of Fine Aggregate with Crumb Rubber”** submitted by **Mr. Kshitij Kumar Singh** (Roll No-20102026, GGV/20/01026), **Mr. Boyilla Venkata Sai Amith** (Roll No-20102050, GGV/20/01049), **Mr. Deepak Pal** (Roll No-20102018, GGV/20/018), and **Mr. Raushan Kumar** (Roll No-20102040, GGV/20/01039) students of B. Tech VIII Semester, in partial fulfilment of the requirements of the award of degree of Bachelor of Technology in Civil Engineering, School of Studies of Engineering and Technology, Guru Ghasidas Vishwavidyalaya (A central University) Bilaspur(C.G.), INDIA, is accorded to the student's own work, carried out by them in the Department of Civil Engineering during the session 2023-24.


Signature

  
08/05/24

**Dr. R. K Choubey**  
Professor, Civil Engg.  
& project Supervisor

Signature

(External Examiners)

  
08/05/24

Signature

(External Examiners)

  
08/05/24

Signature

  
08/05/24

**Dr. Ashish Kumar Parashar**  
HOD, Civil Engineering,  
School of studies of Engineering & Technology,  
Guru Ghasidas Vishwavidyalaya

## ABSTRACT

---

The escalating disposal of waste tyres, from vehicles etc. are a growing environmental challenge worldwide. Crumb rubber, derived from shredded tyres to be disposed of, is a versatile material to be utilized in various sectors like pavement and playgrounds etc. Use of crumb rubber as replacement of fine aggregate in production of Concrete Paver-blocks will be conducive to reduce the exploitation of natural sand along with safe disposal.

Limited research work in the area has been carried out yet and hence the present study is an attempt further to explore and investigate to identify the behavior of Interlocking Concrete Paver Blocks by using the Crumb Rubber as partial replacement of Fine Aggregate in M35 grade concrete (for light traffic conditions) using Ordinary Portland Cement (OPC) and Portland Pozzolana Cement (PCC) has been taken up. The fine aggregate (FA) as sand has been replaced (5%, 7.5%, 10%, 12.5% & 15% by weight) with the crumb rubber (CR) in different concrete mixes (for M-35 grade). The feasible and appropriate shape as I section with thickness as 85 mm (as per IS 15658:2006) has been adopted. Various mechanical and strength properties of the concrete & ingredients have been investigated.

From the test outcome it is concluded that the % optimum FA replacement with the CR for OPC is 12.50, whereas for PPC it is limited to 7.5. The strength properties beyond these % optimum FA replacements with CR was observed to have a decreasing performance in strength parameters for both OPC and PPC. It is also inferred that increase in the % replacement has yielded the lower value of water absorption by the paver blocks samples. The Paver block samples with above % optimum replacements using OPC & PPC both separately, were observed to be durable when exposed to varied temperature and also to Acid for 24 hrs separately. Further, the selected shape had shown the better gripping & interlocking with ease in fixing & placing.