



iJRASET

International Journal For Research in
Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 9 Issue: XII Month of publication: December 2021

DOI: <https://doi.org/10.22214/ijraset.2021.39266>

www.ijraset.com

Call:  08813907089

E-mail ID: ijraset@gmail.com

Experimental Study on Strength of Pervious Concrete by Using Fine Aggregate

Atif Jawed¹, Pushpendra Kumar Kushwaha², Mithun Kumar Rana³, Jiji M Thomas⁴

¹M. Tech. Research Scholar, Civil Department, RKDF College of Engineering, Bhopal (M. P.), India

^{2, 3, 4}Assistant Professor, Civil Department, RKDF College of Engineering, Bhopal (M. P.), India

Abstract: Pervious concrete is a special type of concrete, which consists of cement, coarse aggregates, water and if required and other cementations materials. As there are no fine aggregates used in the concrete matrix, the void content is more which allows the water to flow through its body. The main aim of this project was to improve the compressive strength characteristics of pervious concrete. But it can be noted that with increase in compressive strength the void ratio decreases. Hence, the improvement of strength should not affect the porosity property because it is the property which serves its purpose. In this investigation work the compressive strength of pervious concrete is increased by a maximum of 18.26% for 28 days when 8% fine aggregates were added to standard pervious concrete

Keywords: W/C ratio, pervious Concrete, sugarcane bagasse's ash, rice husk ash compressive strength, fine aggregates

I. INTRODUCTION PERVIOUS CONCRETE

Pervious concrete is an exceptional sort of cement with high porosity. It can be utilized for solid flatwork applications that permits water from precipitation and different sources to go legitimately through, in this way lessening the overflow from a site and permitting ground water energize. The solid glue at that point coats the totals. Pervious concrete, utilized in penetrable clearing, contains a system of openings or voids, to enable air or water to travel through the solid. This enables water to deplete normally through it, and can both expel the ordinary surface-water waste foundation, just as permit recharging of groundwater when regular cement does not. It is framed by forgetting a few or the majority of the fine total (fines). The staying extensive total at that point is bound by a generally little measure of Portland concrete. Whenever set, regularly somewhere in the range of 15% and 25% of the solid volume is voids, enabling water to deplete at around 5 lbf/ft²/min (70 L/m²/min) through the solid



Porosity of Concrete Cubes

II. LITERATURE REVIEW

Tennis, P. D, Leming, M. L., and Akers, D. J. (2014). Pervious concrete is a combination of Portland cement, controlled amounts of water, coarse mixture and little or no sand. The thick cement paste bonds the coarse combination collectively but lets in good enough void formation of approximately 15% to 35%.

Tennis, P.D., M.L. Leming, and D.J. Akers The EPA Storm Water Phase II Final Rule has regulations to manage the quantity of pollutants entering bodies of water. Contaminants may include oils, grains, grease, sediment, anti-freeze, fertilizers, and pesticides. The partially-filtered water is able to percolate into the soil and be further filtered by the soil structure,

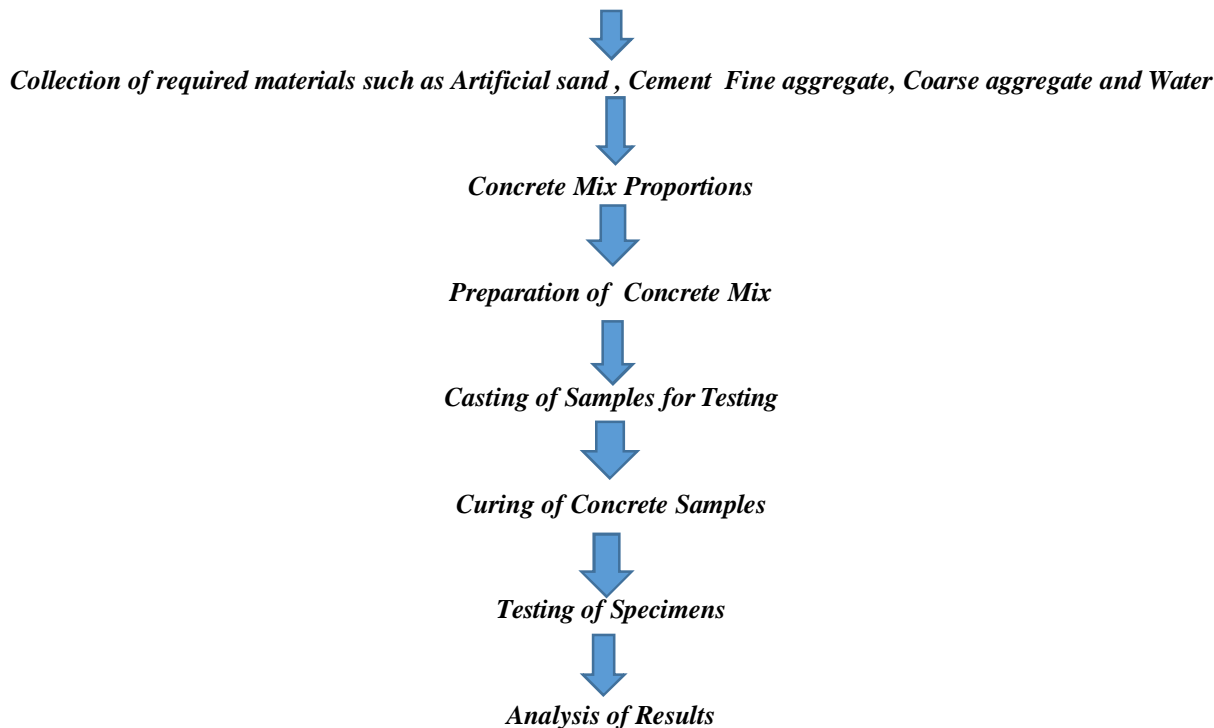
Malhotra, V. M. (2020). Exhibited in his proposal that to make a pervious solid shape with principal penetrability and compressive quality, the measure of water, amount of concrete, type and length of total, and compaction should all be considered, A wide variety of experiments were formerly performed at some stage in the past few a long time by way of a spread of researchers comparing some or all of those factors.

III. OBJECTIVE

- A. To study the properties of Pervious Concrete.
- B. To study the properties of Pervious Concrete with addition of fine aggregates.
- C. To study the properties of Pervious Concrete with addition of Sugarcane Bagasse Ash
- D. To study the properties of Pervious Concrete with addition of Rise husk Ash .
- E. To study the properties of Pervious Concrete with the combination of Sugarcane bagasse ash and Rise husk ash

IV. METHODOLOGY

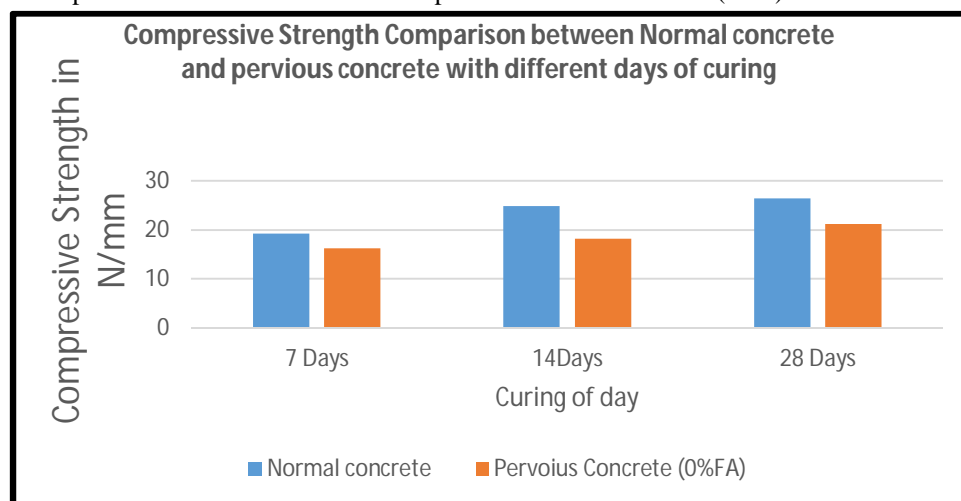
FLOW CHART OF PROPOSED METHODOLOGY



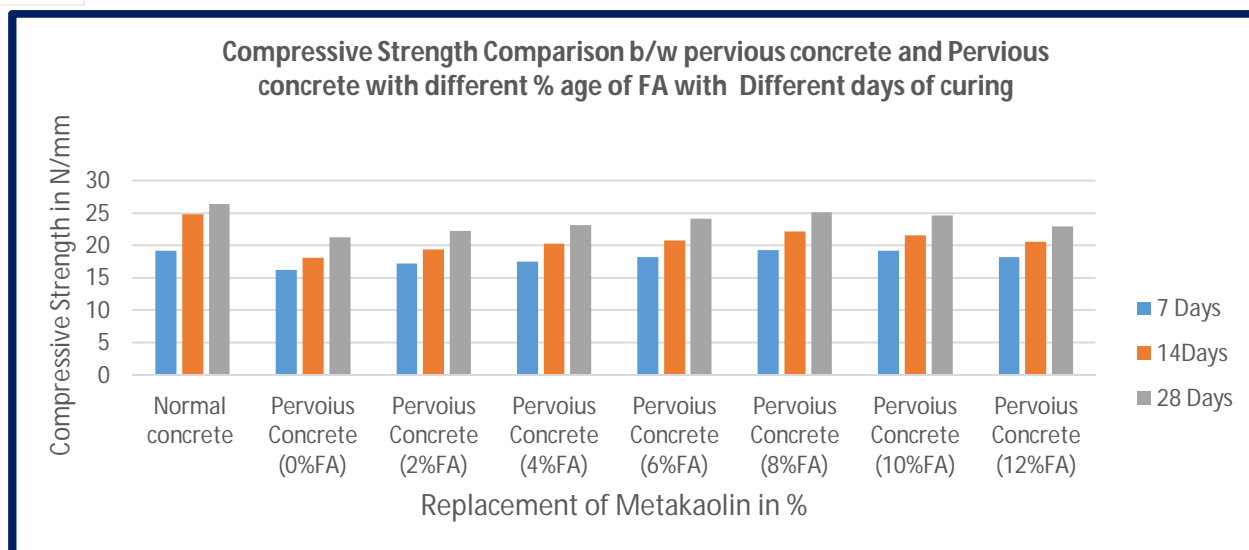
V. EXPERIMENTAL RESULT.

A. Compressive Strength Test

Compressive Strength Comparison b/w Normal concrete and pervious concrete of M20 (MPa)



Compressive Strength of pervious concrete with different %age of fine aggregate



Compressive Strength of pervious concrete with different % age of fine aggregate

The compressive strength of pervious concrete is less than the everyday conventional concrete because of the absence of high-quality aggregates or presence of voids. It must be cited that the everyday conventional concrete is absolutely impermeable in nature

VI. CONCLUSION

- A. The compressive strength of pervious concrete is increased by 3.87% for 28 days when 2% fine aggregates were added to the standard pervious concrete
- B. The compressive strength of pervious concrete is increased by 8.79% for 28 days when 4% fine aggregates were added to the standard pervious concrete.
- C. The compressive strength of pervious concrete is increased by 12.77% for 28 days when 6% fine aggregates were added to the standard pervious concrete.
- D. The compressive strength of pervious concrete is increased by a maximum of 16.10% for 28 days when 8% fines were added to standard pervious concrete.
- E. The compressive strength of pervious concrete is increased by 12.30% for 28 days when 10% fine aggregates were added to the standard pervious concrete.

REFERENCES

- [1] D.Dinesh kumar, Study of pervious concrete, JSR, Volume 3, Issue 3, ISSN: 2455- 2631, March 2018
- [2] Rohit Patidar, Investigation of pervious concrete with polypropylene fiber, (IRJET), International Research Journal of Engineering and Technology Volume- 04 Issue- 12, p-ISSN- 2395-0072, Dec-2017
- [3] ACI 552R: "Report on Pervious Concrete", American Concrete Institute, Farmington Hills, Michigan, (2010)
- [4] Ajamu S.O., Jimoh A.A. "Evaluation of fundamental Performance of Previous Concrete in Construction", International Journal of Engineering and Technology Volume 2 No. 5, May, 2012
- [5] Darshan S. Shah, Prof. J.R.Pitroda, "Evaluation for usage of Gravel in Pervious Concrete", International Journal of Engineering Trends and Technology (IJETT) ISSN No. 2231-5381, Volume: 4, Issue: 10, October 2013, Page: 4306 – 4310
- [6] Ghafoori, N., and Dutta, S., "Building and Non black-top Applications of No-Fines Concrete," Journal of Materials in Civil Engineering, Volume 7, Number 4, November 1995.
- [7] IS 8112:1989. Points of interest for 53grade Portland concrete, New Delhi, India: Bureau of Indian Standards. Dec 1996
- [8] IS: 2386 (Part III) – 1963, Indian Standard, Method of Test for Aggregates for Concrete, (Part III); Specific Gravity, Density, Voids, Absorption and Bulking, (Eighth Reprint); Bureau of Indian Standard, New Delhi, India. Walk 1997.
- [9] IS: 2386 (Part IV) - 1963, Indian Standard, Method of Test for Aggregates for Concrete, (Part IV); Mechanical Properties, (Tenth Reprint); Bureau of Indian Standard, New Delhi, India. Walk 1997.
- [10] J.T. Kerven, V.R. Schaefer, Mixture proportioning considerations for improved freeze-thaw sturdiness of pervious strong, J Mater Civil Eng (2013) 25:886–892.
- [11] Leming, M.L., Rooney, M.H., and Tennis, P.D., "Hydrologic Design of Pervious Concrete," PCA R&D. 2011
- [12] Narayanan Neithalath, Milani S. Sumanasooriya and Omkar Deo.. Depicting pore volume, sizes, and system in pervious bonds for vulnerability conjecture. Materials



10.22214/IJRASET



45.98



IMPACT FACTOR:
7.129



IMPACT FACTOR:
7.429



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089  (24*7 Support on Whatsapp)